pp. 1–88] [January, 1938

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Main Contents:

LEAGUE OF NATIONS: CONFERENCE ON RURAL HYGIENE.

MALARIA.

SPRUE.

MISCELLANEOUS.

For detailed Contents see pp. ii, iv & vi.

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BUREAU OF HYGIENE AND TROPICAL DISEASES.

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LEAGUE OF NATIONS: INTERGOVERNMENTAL CONFERENCE OF FAR-EASTERN COUNTRIES ON RURAL HYGIENE.

Report by the Preparatory Committee. (C.H. 1234.) (Ser. L.o.N.P. 1937. III. 3). [2*s*. 6*d*.]

Preparatory Papers: National Reports.

Report of French Indo-China. (C.H. 1235.) (Ser. L.o.N.P. 1937. III. 4). [3*s*.]

Note on Public Health Organisation in Burma: Note on Medical Organisation in Burma. (C.H. 1235 (*a*).) (Ser. L.o.N.P. 1937. III. 5). [1*s*. 3*d*.]

British India. (C.H. 1235 (*b*).) (Ser. L.o.N.P. 1937. III. 6). [7*s*. 6*d*.]

Report of the Malayan Delegation. (C.H. 1235 (*c*).) (Ser. L.o.N.P. 1937. III. 7). [1*s*.]

Report on Health Organisation in Ceylon. (C.H. 1235 (*d*).) (Ser. L.o.N.P. 1937. III. 8). [1*s*. 6*d*.]

Report of the Bureau of Health, Philippines. (C.H. 1235 (*e*).) (Ser. L.o.N.P. 1937. III. 9). [1*s*.]

Report of China. (C.H. 1235 (*f*).) (Ser. L.o.N.P. 1937. III. 11). [2*s*. 6*d*.]

Report of Japan. (C.H. 1235 (*g*).) (Ser. L.o.N.P. 1937. III. 12). [1*s*.]

Report of Siam. (C.H. 1235 (*h*).) (Ser. L.o.N.P. 1937. III. 13). [1*s*. 3*d*.]

I. A Brief Report on Rural Hygiene in the Colony of Hong Kong; II. Memorandum on Conditions Prevailing in North Borneo; III. Note on the Medical and Health Services in Sarawak; IV. Memorandum Concerning the Colony of Fiji; V. Memorandum on Public Health Organisations of the Gilbert and Ellice Islands Colony; VI. Note on the Health Organisation of the British Solomon Islands Protectorate; VII. Report for the New Hebrides Condominium; VIII. Report for Tonga. (C.H. 1235 (*i*).) (Ser. L.o.N.P. 1937. III. 14). [3*s*.]

Report of the Netherlands Indies. (C.H. 1235 (*j*).) (Ser. L.o.N.P. 1937. III. 15). [5*s*.]

With a view to preparing for an Inter-governmental Conference on Rural Hygiene convened by the League of Nations, at Bandoeng

(Netherlands Indies) on August 3rd, 1937, the various countries invited to send representatives to the Conference were asked to communicate a national report covering the items of the agenda of the Conference, which were as follows :—

I.—Health and Medical Services.
II.—Rural Reconstruction and Collaboration of the Population.
III.—Sanitation and Sanitary Engineering.
IV.—Nutrition.
V.—Measures for combating certain diseases in Rural Districts.

In addition, a Preparatory Committee consisting of Mr. A. S. Haynes, Professor de Langen, and Dr. E. J. Pampana, visited India, Burma, Siam, Malaya, Indo-China, the Philippines, Netherlands East Indies, and Ceylon, and issued a report which is a preliminary study of the problems of rural medicine and hygiene in these countries (see *Bull. of Hyg.*, 1937, Vol. 12, p. 465).

Many of these reports are important and detailed. It is impossible to do justice to them in brief abstracts and they should be read in full by all who are interested in health conditions in the territories in question.

French Indo-China.

Except in the larger centres, medical and general health work are combined in a single service. Traditional medicine, Cambodian or Sino-Annamite, retains the confidence of the vast majority of the people and there can be no question of its prohibition.

The medical staff consists of European doctors, mostly civilians, and an Indo-Chinese body, the majority of whom are Annamites. There is a Medical School at Hanoi, which until recently trained students for a local diploma. Owing to the extension of secondary education this school has now been converted into a Higher School of Medicine, in which students can qualify for a State diploma of the same standard as the French faculties. The policy is gradually to replace Europeans by locally trained doctors. The latter have shown some reluctance to settle in rural areas, but it is hoped to overcome this by the payment of subsidies. The tendency to overcrowding of the medical profession in the towns may help in the same direction.

In the past it was only possible to train local midwives, whose standard of education was poor, but there is now a State midwifery diploma, and fully-trained midwives will gradually take the place of the lower grades.

Sick attendants for rural areas will be recruited in their own villages. Local nurses inspire confidence where a stranger would meet with distrust.

The medical service is based on a provincial organisation. There is a Hospital in the chief town of each province and this is linked up with field ambulances and rural infirmaries. The provincial medical service is responsible for vaccination, inoculation against cholera and typhoid, and the administration of B.C.G., which is given at all the maternity hospitals. Action is also taken against malaria, trachoma, water-borne disease, and leprosy.

Health education is provided for by the medical inspection of schools and school buildings and lectures to teachers and children. Outside the schools, health propaganda is conducted among the mutual education societies and native officials. The rural population is more

difficult to reach. Rural sick attendants while on tour prepare health record-cards of the villages for the use of the Medical Officers. Posters and pamphlets are issued to hospitals and schools and disseminated in rural areas. Co-operation with the native administrations, and with the Education, P.W.D., and Veterinary Service is essential.

Tables are given to show the allocation of medical and health expenditure and the proportion it bears to the total of the budgets. The average total health expenditure per head is 0·391 piastre (1 Indo-Chinese piastre = 10 French francs). The native pays a personal tax of from 2·25 to about 5·50 piastres per annum and this tax is paid by about one-fifth of the population. At least one-third of the personal tax is thus returned to the taxpayer in the form of medical and health benefits.

Rural reconstruction is encouraged by education and propaganda, and by practical schemes of flood-protection, irrigation and drainage.

Details are given of different types of housing, which varies a good deal according to social status and locality. Old superstitions are sometimes in opposition to hygienic principles. For example, " walls must not be pierced with windows, as windows afford openings for the penetration of evil spirits, who dare not use the main gate, which is reserved for the gods."

Village water supplies are often grossly contaminated, but fortunately the water is usually drunk in the form of tea. The Annamite knows how to clarify water by the use of alum. Rain water is preferred above all.

In providing water-supplies for the larger centres the traditional means of purifying water adopted in France was at first followed, but these were soon abandoned in favour of new methods adapted to local conditions. It was found, for instance, that special plant was needed to deal with water containing large quantities of colloidal matter. With modern methods of purification river water is usually the most suitable source of supply. There are certain areas in which for a short period in the dry season the natural water supplies are brackish. In such cases water is collected in reservoirs dug in the ground near a river, filling being usually by gravity.

A simple and effective method of water purification has been designed which is suitable for rural communities. It consists of a sedimentation chamber, filter and tank. After being treated with alum in the sedimentation chamber the water is passed through a filter consisting of a layer about one metre thick of crushed granite gravel of a fineness of from 2 to 4 millimetres, and is chlorinated in the tank. The whole plant can be looked after by a mechanic and a turncock. There is close co-operation between the P.W.D. and the water laboratories of the Pasteur Institutes.

Hygienic methods for the disposal of refuse and excreta are difficult to introduce because domestic manure is used as the chief fertiliser. Improvement will depend on more rational methods of farming. In the meantime every effort is made to protect the sources of drinking-water from faecal contamination.

No general measures of fly control have been undertaken, but efforts have been made in limited areas. A simple type of manure pit is described.

Rice is the staple food. Its cultivation and treatment differ according to whether it is to be used for local domestic consumption or for export. Maize is also widely used. Soya bean, rich in protein

and fat, is an admirable supplement to a rice diet. Meat, where eaten, is usually in the form of pork, but fish, fresh or preserved, is universally eaten. The traditional meal consists of rice, vegetables, fish, eggs, meat or fowl.

Tables are given to show the chemical constitution and value of the principal foodstuffs, and the caloric requirements are discussed in relation to the amount of manual work performed. Diet scales are given for soldiers, prisoners, hospital patients and school-children. The minimum cost of adequate nutrition is considered, and it is pointed out that poverty is the main cause of dietetic deficiencies.

Beriberi is the most common deficiency disease, ranking eighth among diseases treated in hospitals. In addition to measures to discourage the consumption of mechanically husked rice, a more varied and balanced diet is needed, which must be sought by the cultivation of secondary crops and a general raising of the standard of living. This leads on to the question of giving the peasant greater purchasing power by increasing the yield and quality of his crops and by the introduction of new ones. Every effort is being made to encourage fisheries. The schools have an important part to play by spreading practical knowledge and influencing the minds of the people.

Malaria is the disease of greatest economic and social importance. It furnishes the largest number of hospital cases and of deaths in health institutions. The usual measures against individual infection are described, and in discussing antilarval activities reference is made to the value as larvicides of certain waste products such as the discharge from the latex treatment process of rubber, waste-oil from combustion engines, and coal waste containing traces of sulphur. Rice fields can be treated by alternate irrigation and drainage.

Yaws is prevalent in certain provinces and is usually treated by a course of from six to ten injections of bismuth salicylate lasting one month, followed in many cases by a second period of treatment. It is claimed that this method is most successful and that there have been no ill-effects when large doses are given.

Leprosy.—The last attempt at a census gave a total figure of 12,000 lepers in a population of some 29 millions, but this is believed to be an under-estimate. There are about 5,000 lepers in colonies controlled either by the Administration direct or by subsidized missionary organizations. The treatment of lepers as out-patients at leprosy clinics has not been a success, and it is clear that home segregation is only suitable for the rare cases in the well-to-do. Apart from the present system of voluntary segregation an improvement in the general standard of living is the main hope for the future.

Trachoma.—It is stated that there are at least five million people suffering from trachoma. It is most prevalent on or near the coast. Contagious forms of the disease are most prevalent in young children and contamination occurs in early infancy through infected linen. In the rural areas preventive measures are carried out at the infirmaries and by the travelling medical and auxiliary staff.

Cholera.—Cholera is not endemic in Indo-China, but there have been many serious epidemics, believed to have been of foreign origin. Preventive measures have consisted mainly of a sustained effort to improve water supplies, and large scale vaccination.

The report is illustrated with photographs of housing, waterworks, rural industries, etc., and there are maps showing the distribution of malaria and the work of the Anti-Malaria Survey.

Burma.

There is a separate service of public health under a Director of Public Health, whose department comes under the Ministry of Education and Public Health. There are a few whole-time health officers but in most districts the civil surgeons are also responsible for the health work. Sub-assistant surgeons are employed on sanitary and epidemic duties. The municipalities employ a large number of public health inspectors. For port health duties a whole-time staff is employed in Rangoon, and part-time staff in other ports.

In 1934–35, local authorities expended about 17 per cent. of their income on public health services. Active support has been received from the Burma branch of the Indian Red Cross Society, and in many places there are voluntary infant welfare societies maintaining themselves by means of local contributions.

The basis of all preventive work in the country is education and propaganda. Rangoon City has held Health Week Exhibitions for many years and in 1935 this exhibition was awarded the Bostock Hill Memorial Shield in competition with other parts of the Empire.

There is no Government midwifery service, but midwives are employed by the municipalities and district councils.

Registration of vital statistics is in force for about 12 million out of a population of 14½ million.

There is an interesting account of a rural health unit established at Hlegu, 30 miles from Rangoon, in 1929 with the assistance of the Rockefeller Foundation. A complete public health service was set up which included the collection of vital statistics, health education, vaccination, school medical inspection, maternity and child welfare work, control of infectious diseases, refuse and sewage disposal, improvement of water supplies, and abatement of nuisances. In addition to its value as a model of public health activities in a rural area this unit has been a useful field training centre for public health personnel.

Bored-hole latrines have gone a long way towards solving the problem of the disposal of human excreta in rural areas and their adoption is being actively encouraged.

The erection of fly-proof market stalls for the sale of meat and fish has been abandoned as impracticable, but efforts are made to provide buildings which by the nature of their construction discourage flies.

Beriberi is not endemic, nor is it epidemic to any extent, but outbreaks sometimes occur in small communities living under special conditions. The deterioration of rice from damp or moulds was noted as an important factor in certain outbreaks which were investigated. The diet of the average Burman is rich and varied. *Goitre* is widely prevalent in certain areas, especially in some of the hill tracts.

Malaria is endemic throughout Burma and it is dealt with by the Malaria Bureau of the Harcourt Butler Institute of Public Health, Rangoon. In the plains, where there is extensive cultivation of rice, malaria vectors are practically absent, apart from certain irrigated areas; but it is prevalent, sometimes in epidemic form, in hilly districts. Quinine or cinchona febrifuge are distributed either for free issue where authorized, or on payment.

Epidemics of *cholera* occur from time to time. The population has learnt to appreciate the value of preventive measures, especially inoculation.

The control of *plague*, which is endemic, and frequently epidemic, in many towns and districts, is a serious problem. Cyanogas has been found most useful in dealing with burrowing rats ; but most important is the need for better general sanitation, especially in and around markets.

Leprosy presents a serious problem. In areas which have been surveyed the rate is about 16 per 1,000. There are nine clinics for the treatment of leprosy and colonies have been established by the Government and by a Roman Catholic Mission.

The Harcourt Butler Institute of Public Health, Rangoon, opened in 1927, provides a training-school for sanitary personnel, medical students and school teachers, a laboratory for public health work and a centre for propaganda.

The report concludes with a note on Medical Organisation in Burma by Colonel N. S. Sodhi, I.M.S.

British India.

A note on the Central Government's Health Organization and Associated Institutes and Organizations connected with Public Health. . . . . .

By the Government of India Act 1919, medical and public health administration were for the most part transferred to provincial governments. Under the new Constitution, which was brought into force from 1st April, 1937, the position in regard to medicine and public health has not materially changed. The Federal Legislature retains the power to make laws with respect to such matters as the health of cantonments, central institutes for medical and public health research ; the census ; supervision over the health of emigrants and immigrants and the health conditions under which pilgrims proceed to places beyond India ; port quarantine and the control of port health in the major ports ; health and quarantine in relation to air traffic ; and the regulation of conditions of labour and safety in mines and oilfields.

The Central Medical and Public Health Department of the Government of India deals with different departments according to the subject under reference.

The Director-General of the Indian Medical Service is the head of the technical department and, on the civil side, is adviser to the Government of India on all questions of a medical nature.

The Public Health Commissioner with the Government of India is the adviser of the Government on all public health matters and corresponds direct with the departments concerned, but he also acts as staff officer for public health to the Director-General. He advises local governments and provincial Directors of Public Health when asked to do so.

The collection of vital statistics in rural areas is carried out mainly by the village headmen. The chief vital statistics for British India in 1934 were as follows :—

Birth-rate, 33·7.
Death-rate, 24·8.
Infant mortality 187 (rate per 1,000 births).

The Government of India have recently constituted a Central Advisory Board of Health to ensure co-operation between the centre and the provinces and between individual provinces in matters of health which are of common concern.

The only laboratory under the control of the Central Government is the Central Research Institute at Kasauli. [The research work of this laboratory is well known to all workers in tropical medicine.] The serum and vaccine section of the Institute manufactures prophylactic vaccines, other than plague vaccine, for the whole of India.

There are six Pasteur Institutes in India maintained either by local governments or by the Pasteur Institute Association. The tendency nowadays is to decentralize treatment by issuing vaccine to local treatment centres. Out of 44,963 persons treated in 1934, 99·65 per cent. were classified as successful, 0·16 as failures, and there were 0·35 per cent. of deaths.

The Indian Research Fund Association, which corresponds roughly with the Medical Research Council in England, "has for its object the prosecution of research into medical problems and experimental research generally in connection with the causation, mode of spread and prevention of disease."

It depends primarily on funds provided by the Government of India and it has an annual budget of from £50,000 to £90,000. Work is now in progress on malaria, cholera, plague, kala azar, and maternal mortality and morbidity. The report of the Kala Azar Commission and the nutrition researches of Sir Robert McCarrison are outstanding examples of what has been achieved.

After the war, the need for a central malaria organization became apparent, and this led to the formation of the Malaria Survey of India, which is financed by the Indian Research Fund Association. The Malaria Survey advises the Government on all issues relative to malaria, conducts systematic research and epidemiological investigations, advises upon and assists in carrying out anti-malaria measures, undertakes clinical work, including treatment, and holds courses of training for medical and public health officers. In addition to its headquarters at the Central Research Institute, Kasauli, a field experimental station is maintained.

The All-India Institute of Hygiene and Public Health, opened at Calcutta in 1932 with the aid of funds provided by the Rockefeller Foundation, has six sections: (1) Public Health administration; (2) Malariology and Rural Hygiene; (3) Epidemiology and Vital Statistics; (4) Nutrition and Bio-Chemistry; (5) Sanitary Engineering; (6) Maternity and Child Welfare.

The functions of the medical and public health organization of the Government of India are chiefly advisory, but it is also indirectly concerned with curative and preventive activities in Delhi Province and a number of smaller areas.

Details are given of medical relief institutions in British India in 1934, and it is stated that, excluding Delhi Province, there were 4,251 hospitals and dispensaries, which gives an average of one institution for every 58,000 persons living in rural areas. Of these institutions, 84 per cent. were maintained either by Government or by local bodies, and the remainder by private organizations such as missionary societies. But even now dispensary treatment is not within easy reach of many of the rural villages. Efforts are being made to induce private medical practitioners, by means of Government subsidies, to settle in rural tracts.

There is no large scale organization of medical women in India and the work of the Women's Medical Service, with a cadre of only forty-two, is confined almost exclusively to urban centres.

There are very few nurses in the rural areas of India. This is partly due to the fact that rural institutions are intended primarily for out-patients; and secondly, the nursing profession is held in low esteem and few Indian women are prepared to take it up as a career. Midwifery in rural areas is still largely in the hands of the untrained *dai*.

The Government of India has recently made grants to provincial governments to be spent on schemes for economic development and improvement of rural areas. These include amongst sanitary measures anti-malarial schemes, village water-supplies and sanitation, including drainage.

In an appendix to this report Colonel R. N. Chopra gives an account of the School of Tropical Medicine, Calcutta.

Malaya.

There are separate services, closely related and co-ordinated, for curative medicine and public health.

There is a Medical College at Singapore which provides a complete medical curriculum on the same lines as the medical schools of Great Britain. Graduates are granted a diploma—the Licentiate of Medicine and Surgery, Singapore.

There are 179 locally qualified doctors in Government service. They are employed in all Government hospitals and are placed in charge of the smaller district hospitals and various outdoor dispensaries and clinics. Their work is mainly curative, but in certain cases they also undertake health work.

Student sanitary inspectors, Government and private, have the opportunity of taking a course of training for the certificate of the Royal Sanitary Institute, the examination for which is held locally once a year.

Hygiene and sanitation are taught in all schools and the teachers are expected to apply the principles taught practically in their own homes and in the schools.

Modern methods of transport have made it possible to provide one large hospital in each settlement or State and to use the old district hospitals as outdoor dispensaries and collecting stations for the main hospitals.

The Public Health Service, which covers a wide field, is split up into regional divisions, in which are situated health units and centres.

There is a school medical service which aims at the payment of two visits a year by a doctor to each assisted school. The purpose of the first visit is to inspect the buildings and make a medical examination of all the children, referring them for treatment if necessary. The second visit is to note how far recommendations have been followed and treatment carried out.

Expenditure on medical and health services in 1935 was about 9 per cent. of the total expenditure on all departments.

The collaboration of the population in matters of rural hygiene is fostered by travelling dispensaries, infant welfare centres, films on such subjects as infant welfare, tuberculosis, and malaria, exhibitions and clinics; also through the teaching of hygiene in schools, and through the co-operative societies. The rate of progress depends largely on the personality and keenness of the teachers, and it is important that they should belong to the same race as the people they teach.

Subsoil water from anti-malaria drains is made available for bathing and washing clothes. The consumption of raw river water is discouraged by the erection of experimental purification plant, but unless the supplies are easy of access the people will not use them.

In rural areas properly constructed latrines are rare, but tube latrines may help to solve the problem.

The house-fly is not a serious problem in Malaya.

Sufficient information is available about the composition and value of the common foodstuffs. Here, as elsewhere, the quality of the diet depends largely on the spending power of the individual. Polished rice and dried fish are the basis of some of the poorer diets. Government rice mills provide an unpolished rice. School gardens are almost universal. The use of fresh milk is encouraged, but so far there has not been much demand for it.

Malaria being one of the major public health problems the main activities of the Health Service are directed against it. Drainage methods may be surface, subsoil or tidal—permanent or temporary. The usual temporary measures such as oiling and the application of Paris green are employed, together with various hydro-technical methods such as flushing and sluicing of hill-streams. Quinine is distributed free at vernacular schools, police stations, and health centres. The average Malay has no liking for mosquito-nets and prefers the repellent effect of the smoke of burning coconut husks to protect him while he sleeps.

Although *plague* has existed among the rat population for thirty years there has been a very low incidence of human plague. Apart from rat-catching in the ports no special measures have been taken.

Compulsory legislation is in force against *leprosy*, and there are five leper settlements, three in the Straits Settlements, one in the Federated Malay States, and one in Johore.

Ceylon.

An introduction to this report describes the physical features, climate, and political constitution of the island.

The health and medical services are vested in a Ministry of Health, which controls the following services :—

(*a*) Medical and Sanitary.
(*b*) Board of Quarantine.
(*c*) The Medical College.
(*d*) The College of Indigenous Medicine.

A public health branch of the service was created in 1913 and under the present system medical officers may be employed either on the medical or public health side. In the district work of the past attention was paid mainly to environment and the control of epidemics. More recently health units have been established and the medical officers of health conduct ante-natal and infant welfare centres, carry out medical inspection of school children, and give mass treatment for hookworm and malaria and preventive inoculations. Curative work is financed by the central Government, while local preventive work is a charge on the area concerned.

The training of doctors is carried out at the Ceylon Medical College, which is maintained by the Government. The College grants a licence in Medicine, Surgery, and Midwifery, which is registrable in Great Britain. From twelve to twenty medical students pass out each year.

Auxiliary staff consists of apothecaries, sanitary inspectors, nurses, midwives, and vaccinators. The apothecaries are employed as dispensers in the Government hospitals and, later, have charge of rural dispensaries. Sanitary inspectors take the local examination of the Royal Sanitary Institute. Nurses take a course of training of three years with a subsequent period of six months' maternity nursing. Public health nurses spend in addition six months in a health unit. In the past the training period for midwives has been six months, but this is to be extended to eighteen months. Some of the best are to receive a further nine months' training, three months in general nursing and six months in public health nursing—for service as health visitors.

Ceylon is well provided with hospitals, which are maintained by the Government. There are also dispensaries which, with their branches, extend to the most remote villages.

For the period 1925–34 the average infant mortality rate was 169, and the maternal rate 19·4. There are the usual ante-natal and post-natal clinics and domiciliary visits by public health nurses, whose work is essentially educational. Local voluntary organizations take an active part in all child welfare work.

There is a complete system of school medical inspection and each child receives three examinations—in the first, fourth, and seventh standards. A separate branch of the Health Service deals with health education. It is in charge of a special officer who is equipped with models, posters, lantern and cinema outfit. Lectures and health talks are given in the villages and schools.

Modern treatment has almost abolished yaws and where thirteen medical officers were formerly employed there is now only one.

Government and local authorities together spend 11·6 per cent. of their total outlay on public health and medical care.

The recent unprecedented outbreak of malaria brought home very forcibly the prevalence of malnutrition in rural areas, and has led to various measures for improving the living conditions of the peasants. Health work is making progress through the formation of health leagues for individual villages.

Water supplies are being improved by the provision of pipe-borne supplies for the towns and communal wells on a type plan in the villages.

Rice, the staple food, is mostly imported white rice with a small proportion of locally grown rice, which, being hand-pounded, contains more of the pericarp. The chief faults in the diet are a deficiency in protein, vitamin A, and mineral salts, especially calcium. The deficiency of vitamin A is seen in the syndrome of xerophthalmia, sometimes leading to blindness, and an acne-like skin eruption, phrynoderma [follicular keratosis] [similar conditions are common in West Africa, where retro-bulbar neuritis is often associated]. The excessive maternal mortality has been partly attributed to malnutrition in the poorer classes. The well-known deficiency diseases, scurvy, beriberi and pellagra, are not normally met with, and rickets is rare.

Malaria control is in the hands of a committee consisting of health officers, an entomologist and a sanitary engineer. Their duties are to keep in view the malaria situation as a whole, to put forward plans for dealing with it, and to initiate malaria campaigns. All the usual temporary and permanent measures are employed. The central

Government bears the cost of all work, but local authorities contribute to its maintenance.

Plague is endemic in Colombo and it spreads from there to the bazaar areas of the rural districts.

Ankylostomiasis is dealt with by mass treatment, latrine construction, and health propaganda.

The Philippines.

Health administration is in the hands of a Director of Health with branches for Administration, Epidemiology, Hospitals, Sanitation, and Maternity and Child Welfare.

The country is divided into health districts usually consisting of one province, each in charge of a whole-time health officer, under whom are presidents of sanitary divisions (part-time officers). Under these again are sanitary inspectors, disinfectors, vaccinators, and a corps of nurses.

The City of Manila has a public water supply and in many of the rural districts artesian wells have been sunk.

Tuberculosis is apparently very prevalent [no statistics are given]. A Tuberculosis Commission appointed in 1930 has been carrying out a survey and study of tuberculosis conditions in the towns and rural districts, and a central laboratory has been established for research work. Control measures consist of case-finding, treatment, health education and follow-up work. There are seven tuberculosis X-ray clinics and sanatorium with 300 beds.

Malaria.—In sparsely populated endemic areas house-to-house visits are paid and cases discovered are treated in dispensaries. In more thickly populated rural areas anti-larval control against *A. minimus*, the proved vector of malaria, is carried out. For the protection of temporary populations (*e.g.*, lumber camps), spraying with Paris green is found to be effective. Elsewhere biological methods are employed.

Leprosy is one of the major health problems. The Segregation Law provides for the detection, isolation, treatment and care of bacteriologically positive cases and the control and follow-up of clinical (bacteriologically negative) cases. In addition to the Culion Leper Colony and the Leprosy Department of the San Lazaro Hospital there are treatment stations for compulsory detention of positive cases in certain areas where the disease is rampant. Every province has a detention camp for temporary isolation and treatment of cases prior to their transfer to an established station. Contacts are examined periodically and suspected cases are treated for a year and examined clinically and bacteriologically twice a year for two years.

Tables are given to show the chemical composition and nutritive value of the principal foodstuffs peculiar to the Philippines. The high incidence of beriberi and its high mortality, the lack of resistance to respiratory disease, and the prevalence of dental caries are all evidence of widespread malnutrition. The Health, Educational and Agricultural services are all collaborating in plans for a co-ordinated nutrition policy.

China.

China is essentially an agricultural country and even to-day 340 millions of the population live on the land. The country is overpopulated and in some provinces the population reaches 2,000–3,000 per square mile. Poverty is extreme and the average income of a farmer is estimated at less than forty dollars a year, of which 90 per cent. is spent on food.

A Ministry of Health, now known as the National Health Administration, was formed soon after the National Government was established at Nanking in 1928.

Nine out of the eighteen provinces now have provincial health administrations and there are over 200 rural health units. In a country with such diverse customs and traditions, uniformity of administration is impossible and methods must be governed by local conditions. There is, however, a standard type of health organization which is being applied to as many districts as possible. The unit is the *hsien* (district or county) and there should be a hsien health centre with a full-time health officer and public health nurses and midwives. Under the health centre there is a health station staffed by a health officer and a nurse. Under the supervision of the health station there are sub-stations, commonly located in schools, run usually by a woman nurse with midwifery and public health training. Finally, there are village health workers, laymen who have received a short period of training in reporting births and deaths, vaccination, and simple sanitation.

Such vital statistics as are obtained are collected by the police. So far this system has reached only the marketing towns, and even in cities and district towns little reliable information is available. According to rural field workers the crude birth rate is about 30 per mille, crude death rate about 25, infant mortality about 200, and maternal mortality about 10. Apart from endemic diseases the chief causes of mortality are gastro-intestinal infections, tuberculosis, tetanus neonatorum, smallpox, diphtheria, and acute exanthemata.

Even in the most developed districts old-style practitioners still attend over 65 per cent. of the population, while about 26 per cent. die without receiving any treatment at all.

Although vaccination was introduced into China more than a hundred years ago, smallpox continues as a chief cause of mortality.

It is difficult to effect any improvement in maternal and child health in rural districts. Midwifery is in the hands of completely untrained women and attempts to improve the standards if these old-style midwives have not been successful. Trained midwives are expensive and are often unwilling to live under rural conditions.

An important experiment in rural sanitation was started in 1935 in the Kiang Ning Hsien, south of Nanking, an area of some 940 square miles. The aim of the scheme is threefold :

(1) to provide a field laboratory for training health workers ;
(2) to provide field facilities for studying rural sanitary problems ;
(3) to promote the welfare of the farmers by improving their sanitary conditions in such respects as housing, water supply, and disposal of excreta and refuse.

Chinese diet, while adequate in caloric value, shows a preponderance of cereals but is deficient in animal food and in milk and dairy produce. It is therefore low in vitamin A and calcium. Rice is the staple food in South China and wheat in North China.

Deficiency diseases are very prevalent. *Xerophthalmia* is common among factory workers and soldiers. *Rickets* and *osteomalacia* are commonly met with at the clinic of the Peiping Union Medical College. *Beriberi* is prevalent in South China, where polished rice is the staple food. *Scurvy* and *pellagra* are comparatively rare.

Malaria.—A review of the malaria situation in China by Faust in 1926 showed (1) complete absence of endemic malaria in the north-west; (2) severe infection in the lower Yangtze valley and along the south-east coast, reaching its saturation point in Formosa, Hainan and Tonkin; (3) heavy infection in south-western Yunnan and the Upper Yangtze Valley; (4) relatively little malaria in Manchuria and Hunan Province. During the past ten years there have been two considerable epidemics in the lower Yangtze Valley, the first after the flood in 1931, the second in the autumn of 1936. There have also been a number of epidemics of minor importance. The wider distribution is due largely to movements of troops, while natural causes, such as floods and famine, have played a part by lowering individual resistance.

Over 95 per cent. of the malaria in China occurs in rural districts, especially in the rice-growing areas. Owing to the lack of a modern irrigation system farmers keep the water continuously in the fields. Drainage of the fields at regular intervals and improved methods of storage of water would reduce mosquito-breeding considerably.

Plague.—An account is given of outbreaks occurring in many districts of China in recent times, and in an appendix, details are given of an anti-plague campaign in the town of Lungyen in 1935.

Leprosy.—In China, as elsewhere, leprosy is a disease of rural areas. The report contains a map showing leper areas, together with the hospitals and clinics. It is estimated that the total leper population of China is about a million, mostly in the villages. This being the case, village clinics are more likely to benefit the sufferers than leprosaria situated in the towns, and attention is now being devoted to an extension of these clinics, including mobile units.

The report is illustrated by a series of photographs depicting housing, sanitary structures, anti-plague work, and other public health activities.

Japan.

General public health is administered by the Central Sanitary Bureau of the Department of Home Affairs, which is divided into four sections dealing respectively with:—

(1) Health preservation.
(2) Chronic diseases prevention.
(3) Acute infectious diseases prevention.
(4) Medical.

There is a number of advisory councils, all of which are under the supervision of the Minister of Home Affairs. Locally public health administration is apparently controlled mainly by the Chiefs of the Police. In localities where there is a dearth of private practitioners the Government has organized a service of doctors for emergency or regular visits. In some cases doctors are subsidized by Government.

In 1934 the health budget of the Central Sanitary Bureau was 15·64 per cent. of that of the whole Ministry.

Health unions co-operate with the authorities to take action in health matters, and co-operative societies take an active part in the establishment of rural dispensaries and hospitals, and in rural rehabilitation.

Most of the towns and urban districts are provided with proper water supplies. In rural districts the quality of drinking water is generally good and the supply abundant.

Most of the refuse in rural districts is used as fertilizer by the farmers or as fuel. To prevent danger from the use of night-soil farmers are

advised to adopt the "sanitary privy" and build night-soil storage tanks on the farms to ensure complete decomposition. The effluent from this privy is considered to be free from the danger of both parasitic and infectious diseases. [There is a plan of this privy, which is really a tank latrine.]

Rice is, of course, the most important item in Japanese diet. Experiments made at the Government Institute of Nutrition have proved that rice hulled to the extent of seven-tenths is the healthiest and most economical.

Plague.—Apart from a few cases in the cities of Osaka, Kobe, and Yokohama, Japan has been free from plague in recent years.

The death rate per 10,000 of the population for all forms of *tuberculosis* in 1934 was 19·3; for pulmonary tuberculosis 14·2; and for other forms 5·1. The death-rate in rural areas has shown a relative decline during the past ten years. Measures taken by the Government include an increase in the number of sanatoria, provision of anti-tuberculosis centres, and national propaganda.

There were 15,193 *lepers* in Japan in 1935. There is accommodation for 7,000 in existing leprosaria and it is expected that within three years there will be provision for all cases whose isolation is considered necessary, and that in ten years thereafter leprosy will have disappeared from the country.

Siam.

A Department of Public Health was instituted in 1918 to organize and control both preventive and curative medicine in the country. Decentralization is encouraged, but until fully qualified personnel is available the class of work handed over must be limited to their capacity. The central administration provides technical assistance and advice. "Public health work is only effective with the full co-operation of the local inhabitants, and the creation of local responsibility is an important means towards that end."

It is considered that in Siam preventive and curative medicine should be under a single central control.

The country is split up into four health divisions, each with first-grade hospital and training centre for subordinate health staff. There will be a Health Board for each province and rural health centres are being developed. The present type of untrained communal healers will be replaced gradually by trained assistants.

There are at present only some 500 qualified medical men and women to serve a population of over thirteen millions. The training of auxiliary staff will not be difficult as secondary education is sufficiently advanced to provide suitable recruits in adequate number.

Co-operative credit societies are likely to play an important part in promoting economic progress. Improved road communications are essential to public health progress.

The difficulties of rural sanitation in Siam are economic and are not due to religious practice or national habits. In rural districts water is obtained from rivers or from shallow wells. During the dry months riparian populations are liable to epidemics of *Cholera*. At such times temporary water supplies are organized, alum and chloride of lime being employed. Public wells are useful but hand-pumps soon get out of order. Rain water is collected in all available jars and tanks [Siam is fortunate in being free from the menace of yellow fever].

Rural economic surveys have shown that nutrition problems are urgent. Polished rice is largely consumed and there is a tendency to use salted and pickled rather than fresh fish. Little use is made of the local livestock for food, although plenty is available.

Malaria presents a serious problem with nearly 35,000 deaths per annum in a population of some thirteen millions. It occurs chiefly in the hilly districts of the north and south. It is proposed to employ four survey units, one for each division of the country, with a central laboratory in the capital. In the meantime, large scale treatment is needed and the Government is assisting by distributing quinine free or at less than cost price.

Tuberculosis is fairly prevalent in Siam, and the statistics show over ten thousand deaths a year. It is more common in urban centres than in rural districts. An Anti-Tuberculosis Association has been formed, and a centre is being set up in Bangkok for free examination and treatment.

Leprosy.—A survey has shown 16,893 lepers fairly evenly distributed throughout the country. Both the Government and certain missionary bodies maintain leper colonies, but more are needed. At present a good deal of domiciliary treatment is carried out.

Hong Kong.

The territory of Hong Kong consists of the island of Hong Kong itself with the peninsula of Kowloon and a leased area known as the New Territories. It is situated just within the northern limit of the tropics. Population is about 1,000,000. The health and medical services are in the hands of a single Director.

The territories are divided into two medical districts in charge of Chinese Medical Officers. There are a number of fully equipped dispensaries and one mobile dispensary staffed by nurse midwives and dressers. These dispensaries provide a complete medical service, including infant welfare, school medical work, and venereal disease treatment and propaganda. The St. John Ambulance Association has also established dressing-centres and dispensaries.

The chief vectors of malaria are *A. minimus* and *A. jeyporiensis* breeding at the foot of hills or valleys.

The report is illustrated with photographs.

North Borneo.

Medical and health work are carried out by the same staff. Difficulties of transport render the establishment of a central hospital impossible, but there is a system of dispensaries under the charge of Chinese or native dressers, and closer contact is made with the natives in their own villages by touring dressers.

School gardens are being opened at all vernacular schools to teach the children how to grow the right kinds of crops. The staple diet is whole rice or tapioca and *beriberi* is seldom seen. There is endemic *goitre* in some of the villages.

Malaria is hyperendemic. Treatment with quinine is given at the dispensaries and by touring officers.

Sarawak.

Medical and health work are carried out by the same staff. Most of the population live in towns on the sea-coast or on the banks of rivers. There are effective health organizations. There are few roads and communication is mainly by water.

The headquarters of medical and health work is in the town of Kuching, with a population of 30,000. There is a well-equipped hospital of 300 beds. Special attention is paid to midwifery and the number of confinements in this hospital has risen from 15 in 1927 to 300 in 1936.

There are dressing-posts throughout the country and the dressers also receive training in health matters.

The use of N.A.B. for *Yaws* has done much to gain the confidence of the people in Western medicine.

Fiji.

There are about 150 inhabited islands in the Fiji group with a total population of roughly 200,000. Fijians form about half of these and the remainder are mostly Indians. For the Fijians there is a medical organization which includes native medical practitioners, with provincial hospitals and dispensaries at convenient points. In addition to Government medical officers of the Colonial Medical Service there are local medical practitioners trained in the Central Medical School at Suva.

In 1935, 9·2 per cent. of the Government revenue was devoted to medical and health services.

Fiji is entirely free from *malaria*. *Ankylostomiasis*, formerly a disease of great importance, has been brought under control, and the same may be said of *yaws*.

There has been a Medical School in Fiji for about 50 years, and it is recorded that the first eight students qualified as native medical practitioners in 1889. In 1928, with financial assistance from the International Health Board of the Rockefeller Foundation, this school was enlarged and was re-opened with forty students as the Central Medical School. Arrangements were made to take students from other Pacific administrations. Up to the end of 1936, 195 medical practitioners had graduated from the Central Medical School. The course is one of four years. The aim of the school is to fit its graduates for the normal responsibilities of medical practitioners and health officers without removing them from their native environment. They are competent to deal with ordinary epidemics, carry out mass treatment, and conduct preventive measures, such as soil sanitation, and infant welfare.

Gilbert and Ellice Islands.

The health and medical services provide treatment for the whole population and conduct campaigns against such diseases as yaws and hookworm. There are two main hospitals and on each of the 25 islands of the group there is a hospital of native construction with one or more native dressers in charge.

British Solomon Islands.

This is a group of volcanic islands situated from 5° to 12°30′ south of the equator. There is a population of about 94,000, entirely rural in character. Medical and health work are carried out by the same staff. The Protectorate is co-operating in the schemes for training native practitioners in the Central Medical School at Suva, Fiji, and it is hoped eventually to employ about twenty graduates from this school.

The Medical Service normally maintains a vessel in which a travelling medical officer visits the districts to keep in touch with the work of the native medical practitioners and carry on health propaganda.

Mass treatment of *ankylostomiasis* and *yaws* has resulted in a great improvement in the health of the population in recent years.

Report of the New Hebrides Condominium.

(Prepared jointly by the British and French Authorities.)

There are, strictly speaking, no health or medical services financed and controlled by the Condominium Government, but there exist the following medical services.

(a) *The French Medical Service.*—This service is financed and controlled by the French Government. Its objects are to provide medical treatment both for non-natives and natives at certain centres and to protect the health of labourers on French plantations.

(b) *Presbyterian Mission Medical Service* ;

(c) *Melanesian Mission Medical Service.*—The two latter services are intended primarily for natives, but non-natives are treated in urgent cases.

(d) *Condominium Medical Service.*—This consists of certain members of the French National Medical Service and mission doctors in the group.

Curative activities consist mainly of the treatment of cases brought to the medical centres. It has not been possible to undertake properly planned campaigns against the chief native diseases, yaws and malaria.

Tonga.

The Kingdom of Tonga consists of three main groups of islands and certain outlying islands between 18° and 22° South latitude. Population is about 32,000. Medical and health work are carried out by the same staff. The medical service is based on a central hospital in the main groups with outlying dispensaries.

The standard of life and education is comparatively high for a native people. Infant welfare and ante-natal clinics have been started at the hospitals with encouraging results. Food is plentiful and dietetic deficiencies are attributable to ignorance rather than poverty.

Tuberculosis is a serious problem. Out of 203 deaths in patients treated by the Medical Service in 1935, 57 were from tuberculosis.

Filariasis and *elephantiasis* are present throughout the Kingdom.

Netherlands Indies.

This immense group of islands covers an area 3,000 miles from west to east and 1,200 miles from north to south. The population is approximately 65 millions, of which about 42 millions live in Java, where there is great density of population (314 per square kilometre). It is essentially a rural population. Politically the Netherlands Indies is part of the kingdom of the Netherlands. Part of it is self-administering.

The Public Health Service comes under the Department of Education and Public Worship. Hitherto entirely centralized a beginning has been made with decentralization. The policy of the Central Government is to hand over curative activities to private initiative and local authorities and enable the health service to devote its main energies to preventive work and the education of the people in health matters. The entire organization is, however, supervised by one Director.

Medical training was first begun in Batavia in 1851, and there is a School of Medicine which gives a Netherlands Indian diploma, regarded as equivalent to the Netherlands diploma. There is now a second school at Sourabaya. In this school more stress is laid upon the practical rather than the purely scientific side.

The report describes fully the training of the various groups of auxiliary personnel. As in some other tropical possessions there are two grades of midwife—the thoroughly trained, few in number, whose education and training has been fairly long and expensive, and simply-trained helpers, inexpensive and available in considerable numbers.

An important part in preventive work is played by the Pasteur Institute at Bandoeng. All vaccines and sera for the whole country are prepared there. A new process of preparing vaccine lymph by preservation *in vacuo* has been devised. Such vaccine will remain potent for years in a tropical climate and has been given good results even in the most remote districts.

A small demonstration health service was established at Poerwokerto in 1933. In this unit medical and subordinate personnel are trained in the technique of health organization. It has been found here that house-to-house visits by trained health workers are the best means of obtaining the co-operation of the native population, and that practical demonstrations and cinema films are of more value than public lectures.

The percentage of the country's entire budget expended for public health was 2·75 in 1936.

Rice is, of course, one of the most important staple foods, but maize, cassava, sweet potatoes, and sago are also largely consumed. The increased planting of soya beans is an important means of supplementing the staple foods. As in other tropical countries the use of animal products is very limited and most of it is consumed at feasts.

A number of diseases common in temperate climates, such as nephritis, diabetes mellitus, hypertension and chronic rheumatism, are seldom seen amongst the agricultural classes in the Netherlands Indies, though they are far from rare in natives, who eat large quantities of fat and protein. *Beriberi* is still a potential danger, especially in town dwellers. The Government combats beriberi successfully by encouraging the growing of leguminous plants, by distributing half-polished rice, and by controlling the dietary of estate labourers. *Xerophthalmia* is met with in many places and it is not improbable that a hypovitaminosis A is very common.

Good work is being done by the Institute for Nutrition Research, founded in 1934, in co-operation with agricultural and horticultural experts. The ordinary native diet while probably adequate in quantity is lacking in variety. Propaganda is needed to encourage a diet which is as varied as possible, and the use of more animal products.

Malaria is found to a greater or less extent in every island of the archipelago. Investigation has shown that while there are thirteen known vectors of malaria in the Netherlands Indies, only one species of anopheline, *A. ludlowi*, which breeds almost exclusively in brackish-water zones, is constantly dangerous. In 1924 a Central Malaria Bureau was founded as a subdivision of the Public Health Service and later a Bureau at Sourabaya. A large number of malaria assistants have been trained in these bureaux.

The mortality from malaria is higher in the towns than in the rural districts. It causes a decline in the population ; in the case of endemic

malaria this is due to a high infant mortality, while in that of epidemic malaria it is the result of interrupted pregnancies.

Anti-malarial engineering work has been carried out chiefly in the principal coastal towns, while in the rural districts there has been systematic distribution of quinine. Rice-fields and salt-water fishponds have been dealt with by periodical drying-out, the latter being stocked with the larvivorous *H. panchax*. Various estates in Java have been protected against *A. maculatus* by shading. It is considered that such biological methods must come first in controlling malaria in rural districts.

Plague.—Java has for many years suffered severely from plague. The actual plague area lies now for the most part in West Java. Between 1911 and the end of 1936 there were 207,666 registered deaths from plague in Java. It is almost exclusively a disease of the native population, the housing of Europeans, Chinese and other groups providing considerable protection against plague. The seasonal prevalence curve shows a maximum at the beginning of the rainy season, followed by a remission in the first half of the dry season. The form is bubonic with a small proportion of pneumonic, but the latter is never epidemic. The principal host is the brown Malayan house-rat (*R. rattus diardii*) and the vector *X. cheopis*.

The chief anti-plague measures are a systematic improvement of houses with large-scale vaccination as an accessory means of attack. Houses are being rebuilt in such a way that the nesting of rats is impossible. Thatched roofs are replaced by tiles, double walls removed, and bamboo replaced by wood.

Tuberculosis.—Government and private institutions co-operate in preventive work, which takes the form of education, treatment and isolation of persons suffering from open tuberculosis ; better housing ; raising the resistance of the general population by campaigns against community diseases such as malaria and hookworm ; and improving the standard of diet. Much useful social and hygienic work is carried out by an Association for Tuberculosis control with local branches in many of the towns.

Yaws is widespread in the Netherlands Indies. It is usually treated with Neosalvarsan. Millions of people have been treated in the hospitals and clinics. Special campaigns of mass treatment are organised in districts where this is necessary, the entire population is examined and all infectious cases are treated. As a rule three injections are required.

The report is illustrated by twenty-nine photographs depicting, amongst other subjects, housing, health education, anti-malaria measures, and sanitary structures. *W. H. Peacock.*

MALARIA.

FEDERATED MALAY STATES. **Annual Report of the Malaria Advisory Board for the Year 1936** [KINGSBURY (A. Neave), Chairman]. 17 pp. With 4 charts. 1937. Kuala Lumpur: F.M.S. Govt. Press.

Malaria in the Federated Malay States in 1936 was less severe than in the previous year, though the number of cases treated in Government and estate hospitals, upwards of 27,000 admissions, was in excess of the corresponding figures for 1933 and 1934. The case mortality rate of cases treated in hospitals has steadily declined from 3·0 per cent. in 1933 to 2·2 per cent. in 1936. Improved methods of treatment and improving economic conditions have contributed to this decline. Graphs are produced illustrating the seasonal prevalence of malaria in the four States of the Federation. The curves exhibit differences which are probably explicable by varying degrees of prevalence of the anopheline vectors in the different States. In other words the area subject to attack by *A. maculatus*, *A. umbrosus*, *A. barbirostris*, *A. sundaicus* and *A. hyrcanus* vary in size and in density of population from State to State.

Observations have been carried out regarding the efficacy of atebrin musonate in the treatment of malaria. The immediate curative effects were satisfactory: the drug is considered to be one of the most powerful schizonticides known. Toxic effects are, however, occasionally alarming. For this reason the report considers that atebrin musonate is not a drug which can be recommended for indiscriminate use.

The results of chemo-prophylaxis experiments on estates are reported (see below p. 36).

Experiments to test the relative larvicide efficiency of various oil mixtures are being carried on and information is supplied regarding the local cost of oil spraying and the cost of permanent drainage. The anopheline survey of part of the Selangor Coast area continues.

Attention is directed to the facilities for mosquito breeding provided by pits left by the uprooting of old trees on rubber estates and by holes prepared for replanting. The pits should be filled up immediately. It is recommended that holes for replanting be filled with a mixture of top soil and green vegetable material, rubber leaves, small twigs or any available cover plants.

The prevention of the deterioration of open cement drains by the action of acid waters is still the subject of experiment. Observations are also being continued on the control of *A. maculatus* breeding by heavy shading. *Norman White.*

DAUER (C. C.) & FAUST (Ernest Carroll)). **Malaria Mortality in the United States, with Especial Reference to the Southeastern States.**—*Southern Med. Jl.* 1937. Sept. Vol. 30. No. 9. pp. 939–943. With 1 chart.

This is a study of the deaths ascribed to malaria during 1935. There was a definite decline of the mortality curve from the 1933–34 peak in Arkansas, Mississippi and Florida; an appreciable decrease also in Georgia, Tennessee and Oklahoma, but a considerable increase in South Carolina, Alabama, North Carolina and Virginia. In all these States

there was a tendency for the rates to decline in the worst endemic areas and to increase elsewhere. Available records of the species of parasite responsible for this malaria mortality and morbidity are considered to be too unreliable for analysis. *N. W.*

EARLE (Walter C.). **The Relation between Breeding Area,** *Anopheles albimanus* **Density, and Malaria in Salinas, Puerto Rico.**—*Southern Med. Jl.* 1937. Sept. Vol. 30. No. 9. pp. 946-949. With 2 charts.

An account of the eventual elimination of the malaria vector and malaria, chiefly by drainage, in difficult circumstances. The potential breeding places were far more numerous than were necessary to maintain a high mosquito density. The mosquito density was much higher than was necessary to maintain a high parasite rate. Neither the mosquito density nor the malaria prevalence was materially reduced until nearly all the breeding places had been brought under control. The malaria prevalence was not affected until the mosquito density had been brought down to, and maintained at, an extremely low figure. *N. W.*

DUREN (A.). Un essai d'étude d'ensemble du paludisme au Congo Belge. [**Comprehensive Study of Malaria in the Belgian Congo.**]—Extrait des *Mémoires* publiés par l'Institut Royal Colonial Belge. (Section des Sciences naturelles et médicales.) Collection in-8o. Tome V. 86 pp. With 4 text figs. & 3 figs. (2 maps) on 2 plates. [92 refs.]

This is an interesting summary of the more important information concerning malaria in the Belgian Congo that has been published during recent years. The country is vast, covering 2,350,000 square kilometres and extending from 5°N to 13°S. Two-thirds of it lie south of the Equator. Half the country is covered by equatorial forest which extends to within 100 kilometres of the eastern frontier. The altitude of this forest land is from 350 to 500 metres. Rain is abundant throughout the year (1,500 to 2,000 mm.) with maximum precipitation from March to May and August to November. Between 3° and 5°N. and 4° and 13°S. the forest gives place to wooded plains rising towards the east and south-east and culminating in the mountains which surround the great lakes and in the high plateau of Katanga. In these wooded plains the climate is tropical. The rainy season is from April to October in the north, and from October to April in the south ; in both the dry season is the cold season. The annual rainfall is from 1,000 to 1,500 mm. The altitude of the wooded plains is from 500 to 1,500 metres. Numerous rivers run from east to west or south to north, the Congo describing a vast semicircle. Marshes are very numerous, especially in the equatorial zone. There are two annual rises in the river levels, in December and in April in Leopoldville ; the former is the more considerable.

The population comprises 18,500 Europeans and 10,000,000 natives (excluding Ruandi-Urundi). Of these natives some 500,000 are congregated round European centres of population, the remainder living in their ancestral villages and communities. The birth rates, death rates and infant mortality rates are all high.

Malaria is second only in importance to trypanosomiasis among the endemic diseases of the Congo. Among the European population, however, it is becoming less prevalent and less severe and this in spite of the fact that women and children form a larger proportion of that population than heretofore. The mean annual malaria morbidity rates for Europeans were 220 per thousand in 1918–20, 152 in 1921–30 and 141 in 1931–34. The mean annual malaria mortality rates during these three periods were 6·39, 3·1 and 1·82 per thousand respectively.

For the native population comparable figures are of course unobtainable. The general mortality rate oscillates between 25 and 30. Of patients treated in hospitals only 3 per cent. are cases of malaria: of these 1 per cent. die. Malaria is a very important cause of mortality in children aged 0 to 3 years, being responsible for 16·5 per cent. of the total deaths at this age. This is for regions in which treatment is available. As a direct cause of death in ripe age it is insignificant.

The pygmies living in the Forest of Ituri have a parasite index of 29·11 (children 40, adults 22·7). Of the infections 80 per cent. are *falciparum*. The Bantu population is more heavily infected. Reports of 44,901 persons examined in different parts of the country during 12 years indicate a parasite index of 51·2 and a spleen index of 35. If the parasite positives be added to those with enlargement of spleen in whom no parasites were discovered, 61·4 per cent. show signs of infection. If those with splenic enlargement be added to parasite carriers without enlargement of spleen a rate of 51·3 is obtained. The parasite index during the first year of life is 63·7.

Malaria is endemic in all parts of the country at altitudes below 1,500 metres and the degree of endemicity varies but little. Above 2,000 metres endemic malaria does not occur. At high altitudes where malaria is not, or only mildly, endemic, in parts of Ruanda-Urundi for example, epidemics of malaria occur. During such serious outbreaks severe cases of haemoglobinuria occur among natives and are often fatal.

Between 1918 and 1934 cases of haemoglobinuria reported among Europeans total 1,115 of whom 217 died. The medical corps is almost unanimous in looking upon chronic *falciparum* malaria as the essential cause of haemoglobinuria, the directly exciting cause being chill, privation, overwork, or quinine. Those who take prophylactic quinine regularly are very rarely attacked. There is generally a history of a dose of quinine taken during an attack of fever by a person who does not take the drug prophylactically. Cases are very rare among natives living in endemic areas.

Of 7,350 positive blood findings 76·6 per cent. were *falciparum*, 20 per cent. *malariae* and only 3·4 per cent. *vivax*. The preponderance of *falciparum* is slightly less marked at high altitudes.

Twenty-one species of Anopheles have been reported from the Congo. *A. costalis* is most abundant: it is an urban and peri-urban species. *A. funestus* and *A. marshalli* var. *moucheti* are wild rural species, very prevalent in native villages. *A. mauritianus* is ubiquitous but seldom found in large numbers.

The building of towns in dried-up marshes, with all that this entails, has had very notable results in the reduction of malaria in the case of Matadi. In the construction of towns the native quarters are placed at a distance from the European, the intervening space being planted with trees. There is widespread belief in the utility of quinine prophylaxis, 40 to 50 cgms. a day. There have been many attempts to

cultivate *Cinchona succirubra*. At altitudes over 1,500 metres in the north-east of the Congo the results are promising. *N. W.*

HILL (Rolla B.). **The Malaria Problem in Portugal.**—*Southern Med. Jl.* 1937. Sept. Vol. 30. No. 9. pp. 953–956.

In 1933 the Rockefeller Foundation assisted in a country-wide malaria survey of Portugal and in the following year established a station in the worst malaria region. The author's paper is based on data collected in this way.

Only two species of Anopheles are found in Portugal, *A. bifurcatus* and *A. maculipennis*, var. *typicus* and var. *atroparvus*. *A. bifurcatus* is a wild species and rare. *A. maculipennis* var. *atroparvus* is the only malaria carrier. It is found everywhere in Portugal, even in places where malaria is absent: in such places it is not found in abundance and is zoophile. Most extensive breeding takes place in rice-fields. In Portugal it is a fresh-water breeder.

Malaria is a public health problem in five regions: they lie in the river basins of the Sado, Mondego, Tagus, Guadiana and Minho Rivers. In the first three the malarious areas grow a large amount of rice; in the latter two the disease is restricted. Itinerant labour is largely employed in planting, weeding and harvesting rice crops. Malaria control is very closely connected with rice-field Anopheles breeding. Screening of itinerant labour barracks and improvement in agricultural methods are necessary. Intermittent irrigation of rice fields has proved successful experimentally: its wide application might effect a marked improvement. *N. W.*

BERNABAI (Adalberto). L'indice splenico e l'indice plasmodico nei bambini di Goluine di Bulo Mererta (Vittorio d'Africa). [**Spleen and Parasite Indexes in Goluine and Bulo Mererta, Italian Somaliland.**]—*Giorn. Ital. di Clin. Trop.* 1937. Aug. 31. Vol. 1. N.S. No. 8. pp. 243–244.

The observations recorded are part of a series whose object is the construction of a malariology map of Italian Somaliland. One hundred and fifty native children in Goluine and 100 in Bulo Mererta were examined: both places are in Lower Scebeli. The parasite index in Goluine was 28 per cent. (*falciparum* 14, *vivax* 12·6 and *malariae* 1·3); in Bulo Mererta it was 19 (*falciparum* 11, *vivax* 8). The spleen index in Goluine was 82 and in Bulo Mererta 62. The examination of thick drops was used in the determination of the parasite index. *N. W.*

DRBOHLAV (Jaroslav). Constatation de cas de paludisme à *Plasmodium falciparum* en Tchécoslovaquie. [**Cases of *falciparum* Malaria in Czechoslovakia.**]—*Bull. Office Internat. d'Hyg. Publique.* 1937. Sept. Vol. 29. No. 9. pp. 1924–1926. With 1 map.

Malaria in Czechoslovakia is confined to sub-Carpathian Russia and to the adjacent districts of Slovakia. It does not present a serious public health problem but there was an increase in malaria prevalence in 1928 and again in 1933–35. Practically all cases were *vivax* infections. In 1936, cases of *falciparum* infection were first noted: there have been 16 cases in 11 communes of sub-Carpathian Russia and 11 cases in 3 communes of adjacent districts of Slovakia. The

origin of these cases is obscure: tropical malaria exists in adjacent parts of Rumania and Hungary. It is noted that these cases occurred soon after the inauguration of an air service between Bucharest and Uzhorod, the capital of sub-Carpathian Russia. The situation is being carefully studied. A malariological laboratory has been opened in Uzhorod. *N. W.*

ACREE (F. M.). **Some Clinical Manifestations of Malaria with Reference to the Gastro-Intestinal Tract.**—*Southern Med. Jl.* 1937. June. Vol. 30. No. 6. pp. 612–615.

This paper is concerned with cases of malaria infection in which nearly all symptoms characteristic of the disease are absent and in which the clinical symptoms simulate primary disease of some portion of the gastro-intestinal tract. In such cases appropriate anti-malaria treatment effects a cure. Ulcers on the tongue, nausea and vomiting, cramps in the arms and legs with a profuse watery diarrhoea, have been met with in cases of this kind. Malaria infection may simulate any of the following diseases, gastric catarrh, peptic ulcer, enteritis, ulcerative colitis or dysentery. Allergic reactions in the skin not uncommonly follow, herpes, urticaria or erythema; petechiae and purpura, ulcers and furunculosis are sometimes seen. Some cases present all the symptoms of cholecystitis, some those of appendicitis. Acute peritonitis may be simulated, as may typhoid fever. *N. W.*

LINTWAREFF (J. J.). Aetiologie der Nephropathien bei Malaria. [**Aetiology of Malarial Nephritis.**]—*Riv. di. Malariologia.* Sez. I. 1937. Vol. 16. No. 3. pp. 173–180. With 1 fig.

The author considers that there is no doubt that the malaria plasmodium manufactures a toxin which circulates in blood of the patient and combines with his haemoglobin. It is a reversible combination. When this haemoglobin-toxin reaches the kidneys it enters the kidney epithelium which it poisons, producing first a fatty and finally a necrotic degeneration. He then details the observations of one of his pupils, Dr. N. SSOLUN, who investigated the problem of a specific toxin in malaria. He injected daily into the peritoneal cavity of guineapigs large amounts (not less than 2 cc.) of haemoglobin obtained from untreated cases of malaria, in whose blood *Plasmodium vivax* or *falciparum* had been demonstrated. After 8–10 injections the pigs were killed by a puncture of the medulla, and the urine from the bladder was investigated. As controls, pigs of the same weight received the same amounts of haemoglobin from an individual who had never suffered from malaria. The kidney tissue was studied histologically. The results of this investigation, the author concludes, clearly demonstrated the occurrence of a specific toxin in malaria cases, which combines with the haemoglobin and causes the nephritis. Albumin in the urine of the experimental animals was 4 to 8·5 per mille, the amount was less in the urine of pigs injected with haemoglobin from patients suffering from *Plasmodium vivax* than in those injected with haemoglobin from cases infected with *Plasmodium falciparum.* The urine and kidneys of the control animals remained normal.

E. D. W. Greig.

TALIAFERRO (William H.) & MULLIGAN (H. W.) **The Histopathology of Malaria with Special Reference to the Function and Origin of the Macrophages in Defence.**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1937. May. Memoir No. 29. pp. viii + 138. With 15 plates. [Bibliography.] [Rs. 3-8-0 or 5s.]

Clinicians and research workers interested in malaria will welcome this memoir which records in a report covering nearly 160 pages the results of a very important investigation into the defence mechanism against infection. The memoir is conveniently arranged in two parts, and it has a very full table of contents occupying 4 pages at the beginning and a bibliography of 12 pages at the end. There are also 15 plates containing excellent reproductions of 16 microphotographs and 21 special drawings illustrating the changes found in the tissues of monkeys infected respectively with *P. cynomolgi* or *P. knowlesi*; and the detailed descriptions of these illustrations cover more than 7 pages of the memoir.

Part I of the memoir, entitled: *Review of the Literature Relating to the Function of the Blood and Connective Tissue in Malarial Defence*, is a fascinating survey of no less than 240 publications by 187 different authors, all of whom have something to say about that aspect of malarial pathology more especially concerned with the defence reactions against infection. During their review of this literature the authors of the memoir take the opportunity to define the terminology used in their own work; this is described in Part II; moreover, while outlining the origin, functions and developmental potencies of the special elements concerned in malarial defence they also present their own special views regarding connective tissue. These views largely follow the "unitarian viewpoint" of MAXIMOW, who believes that the stem cells of the connective, lymphatic and myeloid tissues are all of the same type and that it is environment or abnormal stimuli that determine whether or not they shall give rise to blood lymphocytes, monocytes or precursors of granulocytes. In other words these stem cells are lymphoblasts, myeloblasts, or erythroblasts according to circumstances. The whole memoir is largely concerned with macrophages. It might in fact be described as a monograph on the macrophage. The term macrophage is used by the authors essentially as a physiological designation for the large mononuclear cells which ingest foreign matter or store foreign material from colloidal solution. These cells are easily identified by their phagocytic activity and by selective staining; they can be derived from all cells retaining mesenchymal potencies of development. They occur normally in various connective tissues. The authors discredit the views of MALLORY and others regarding endothelial cells. They find no evidence of phagocytic action by endothelial cells except where trabecular veins are surrounded by a sheath of red pulp. In malarial defence the reticular tissues of the spleen and bone marrow are most important. The reticular cells of the spleen readily become macrophages and those of the red pulp are the most active. In the liver also many large branching cells in sinusoids become swollen and engorged with phagocytosed material. The suprarenals are of minor importance in the phagocytic defence against malaria, and malarial pigmentation of the lungs is the result of migration of macrophages from elsewhere. "All the evidence indicates that phagocytosis is non-specific during

natural immunity" . . . . "During acquired immunity, on the other hand . . . phagocytosis is, in addition, specific." The authors consider that general defence reactions are essentially local reactions in strategically placed organs. When malarial parasites are introduced into an immune animal there is : (1) a regional concentration of parasites, and (2) increased phagocytic action. "This is homologous" say the authors "with what takes place in streptococcal infection." As regards Part II of the memoir entitled : *The Cellular Reactions in* Silenus rhesus *During the Course of Infection with* Plasmodium knowlesi, it is impossible to do justice to a valuable piece of original work of this nature in a brief review. Altogether the authors examined in great detail the tissues from 79 monkeys, of which 12 were normal and 67 were infected with either *P. knowlesi* or *P. cynomolgi* respectively. The more important data relating to each of these monkeys are given in tabular form in the memoir and these tables are self-explanatory. The authors find that phagocytic activity, lymphoid hyperplasia and the concomitant cytogenesis of macrophages are initiated in the spleen and are always most pronounced there, but similar changes though in a less degree also occur in the liver and bone marrow as the intensity of malarial stimulation increases. In the opinion of the authors themselves, the chief significance of their work lies in the information obtained regarding the source and cytogenesis of the newly-formed macrophages which are associated with the defence of the body against malaria. We can heartily recommend this memoir. *C. A. Bentley.*

Ciuca (M.), Ballif (L.), Chelarescu (M.), Isanos (M.) & Glaser (L.). **Action of Quinine and Atebrin on the Sporozoites of** *Plasmodium falciparum.—Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. July 31. Vol. 31. No. 2. pp. 235–240.

The salivary glands of 16 Anopheles infected with malignant tertian malaria were dissected on a slide in a solution of basic quinine, 1 in 2,500. The resultant suspension, 0·5 cc. was injected intravenously into a patient requiring malaria therapy. The patient contracted malaria after an incubation period of 15 days. The sporozoites from the different glands were not of course in contact with the drug for the same time before injection : the minimum exposure was 30 minutes. The glands took 30 minutes to dissect.

A second patient received an intravenous injection of a suspension of the sporozoites from 14 salivary glands in a solution of atebrin, 1 in 2,500. Evidence of infection was observed on the 15th day.

In a second series of experiments each patient received intravenously a suspension of sporozoites from a single infected gland, the dissection being made as before in the solution of the drug. Four patients received a suspension of sporozoites in a solution of basic quinine, four a suspension in a solution of atebrin and four, as controls, a suspension in Ringer's solution. The contact of the sporozoites with the drug was of 15 minute's duration. One of the atebrin series, two of the quinine series and two of the four controls became infected.

It would thus appear that malaria sporozoites are able to withstand the direct application of quinine and of atebrin in a concentration of 1 in 2,500. *N. W.*

CASINI (Guido). Il periodo di maturità sessuale delle semilune. [**Duration of Sexual Maturity of Crescents.**]—*Riv. di Malariologia.* Sez. I. 1937. Vol. 16. No. 2. pp. 108–110. With 25 coloured figs. on 1 plate. English summary (8 lines).

In addition to the immature forms of crescents which develop in the internal organs of cases of *falciparum* infection, the author describes and figures two other stages in the development of crescents both of which are found in the peripheral blood—the well recognized mature forms that are capable of infecting anophelines and senescent forms that have lost that power. These senescent forms can be easily recognized in well prepared films. They are very thin, transparent, either vacuolated or granular, staining more or less uniformly, often very incurved or with the thin ends folded at a right angle to the long axis of the crescent. They appear to have lost their elasticity and are easily "folded." They are most commonly seen in chronic cases, in persons who have been harbouring crescents for at least ten days.

N. W.

MALAMOS (Basilios). Malaria und reticulocyten. [**Malaria and Reticulocytes.**]—*Klin. Woch.* 1937. June 19. Vol. 16. No. 25. pp. 885–887. [13 refs.]

The author is unable from his observations to confirm the statement of JACOBSTHAL (this *Bulletin*, 1936, Vol. 33, p. 779) that a large proportion of malaria parasites are contained in reticulocytes. [The reviewer can confirm Malamos's findings from his own investigations on this subject.] Also the view of HUNGST, that Schüffner's dots are of reticular nature, cannot be regarded as established. The two stipplings stand in no relation to each other in the opinion of the author. *E. D. W. Greig.*

VILLAIN (Georges) & DUPOUX (Robert). Contribution à l'étude sérologique du paludisme. Utilisation d'une mélanine artificielle: la M.A. floculation. [**Contribution to the Serological Study of Malaria: Flocculation with the Use of an Artificial Melanin.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Nov. Vol. 25. No. 3 & 4. pp. 469–551. With 5 figs. [64 refs.]

This paper starts with a concise historical account of Henry's reaction and of the large amount of work that has been devoted to its elaboration, modification and significance. The different views that are held regarding the nature of the reaction are well presented. More than three years' work, devoted by the authors to the search for other substances, has led to the conclusion that the melanins are the best serological detectors of malaria at present available. They have succeeded in preparing an artificial melanin combined with iron, a dark brownish-black liquid, which in suitable doses behaves almost exactly like Henry's melanin preparation. It is made by oxidizing tyrosine with hydrogen peroxide in the presence of a small quantity of perchloride of iron. This is the preparation which they designate M.A. Full details are given concerning its preparation and use. The technique is easier than that of Henry's reaction and the authors consider that it should be of value to malariologists working away from well equipped laboratories. *N. W.*

D'ALESSANDRO (G.). Sulla cira di Maurizio Ascoli nelle infezioni malariche. Nota VI.—Comportamento della reazione di Henry. [**Behaviour of Henry's Reaction in Cases of Malaria Infection treated by Ascoli's Method.**]—*Riv. di Malariologia.* Sez. I. 1937. Vol. 16. No. 4. pp. 290–294. [40 refs.] German summary.

The behaviour of Henry's reaction was studied in 32 cases of chronic malaria that were being treated by Ascoli's method. In nearly all cases that gave a positive reaction at the beginning of treatment the reaction became negative before the end. In cases which gave a negative reaction at the beginning the treatment promptly reactivated the reaction which once more became negative before the end of treatment. This influence that Ascoli's treatment has on Henry's reaction constitutes yet another argument in favour of its efficiency. *N. W.*

MATSUNOBU (Masami). Beiträge zur Kenntnis der Hämatologie bei Malaria. II. Mitteilung: Das Studium des Knochenmarkbildes durch Sternalpunktion. [**The Blood in Malaria. III. Study of the Bone-Marrow.**]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1937. Sept. Vol. 36. No. 9 (390). [In Japanese pp. 2104–2115. [14 refs.] German summary p. 2116.]

Study of the bone-marrow, obtained by sternal puncture, in cases of malaria was undertaken with several ends in view. First, to note haematological changes in the course of the disease; second, the form of the parasites in the intervals between attacks or relapses; thirdly, to determine whether parasites were more numerous there than in the peripheral blood, as an aid in clinical diagnosis if they were scarce in the latter; and lastly, to see whether the parasites preferred young to old corpuscles for attack.

It was found in smear preparations that parasites were not more numerous than in the peripheral blood and therefore sternal puncture has no diagnostic advantages; the plasmodia showed no particular tendency to invade the younger forms of erythrocyte. The myeloid reaction 2–6 days after reduction of the fever by atebrin and plasmoquine was not marked, in fact the marrow picture showed no departures from the normal. *H. H. S.*

MOSNA (E.) & CANALIS (A.). Profilassi e terapia della malaria coi prodotti sintetici. (Esperienze coordinate dal Comitato d'Igiene della S.d.N.). [**Prophylaxis and Treatment of Malaria with Synthetic Drugs. Experiment coordinated by the Health Committee of the League of Nations.**]—Supplement to *Riv. di Malariologia.* Sez. I. 1937. Vol. 16. No. 3. 74 pp. With 1 fig. & 4 graphs. English summary (8 lines).

A well written report of well controlled observations on the value of atebrin as a prophylactic of malaria and of atebrin and plasmoquine in the treatment of the disease. The prophylaxis experiment was carried out in Posada, a small town of 150 houses and a population of 781, in Sardinia. The population is a stable one, poor, badly housed and indifferently nourished. Practically everyone is infected with malaria: tuberculosis and trachoma are also widespread. Anophelines are very prevalent, *A. maculipennis labranchiae* being of chief importance; it attains its maximum prevalence in June. Before

the experiment began on the 13th May, 1935, the spleen index of children under 15 years of age was 78·7 per cent. and the parasite index 21 per cent. The population was divided into three groups as nearly homogeneous as possible. The first group, consisting of 235 persons, received 0·05 gm. of atebrin daily, smaller doses for young children; the second, 244 persons, received 0·20 gm. of atebrin twice a week (adult dose); the third, 229 persons, was the control group. The administration of the drugs was continued till the end of October and the observation of the population was continued till the following April. No symptoms of drug intolerance were observed. Between May and October there were 55 cases of malaria in the "daily group," 23·4 per cent., 34 cases in the "bi-weekly group," 13·9 per cent., and 161 cases in the "control group," 70·3 per cent. In the neighbouring town of Torpé, where anophelines are less prevalent, there were 924 cases in a population of 1,000 as compared with 250 cases among the 781 people of Posada. Atebrin was a more effective preventive of *vivax* than of *falciparum* malaria. Gametocyte carriers observed were 1·7 per cent. of the "daily group," 0·8 per cent. of the "bi-weekly group" and 4·8 per cent. of the control group. In the post-prophylaxis period, November to April, there were 91 cases of malaria among the 781 people of Posada as compared with 221 cases among Torpé's 1,000 people. During these months cases in the "daily group" were 14 per cent., in the "bi-weekly group," 6 per cent., and in the control group 18·7 per cent. The anopheline infective rate was 1·1 per cent. as compared with 2 per cent. in Torpé. The reduction of morbidity was less marked among children under 8 years of age, indicating, probably, that the doses given were too small. Better results were obtained by the bi-weekly than by the daily administration of the drug.

Observations on the curative value of the drugs were carried out on 940 cases in Torpé. No cases exhibited intolerance to atebrin worthy of note but among 27 patients treated with plasmoquine for five days, 14 exhibited symptoms of varying degrees of severity attributable to the drug. The observations confirmed the well known therapeutic value of these drugs. *N. W.*

SPAAR (Eric C.). **The Modern Treatment of Malarial Fever.**—*Malayan Med. Jl.* 1937. June. Vol. 12. No. 2. pp. 44–46.

A discussion of the merits of the cinchona derivatives and synthetic drugs in the treatment of the various forms of malaria and the indications for their use. *N. W.*

BORMIOLI (M.). Considerazioni sulla terapia delle perniciose e delle gravi forme estivo-autunnali. [**Treatment of Pernicious and Severe Attacks of Malignant Tertian Malaria.**]—*Ann. di Med. Nav. e Colon.* 1937. July–Aug. 43rd Year. Vol. 1. No. 7–8. pp. 318–322, 325–330. With 4 charts.

The author claims to have had a large experience of the treatment of pernicious cases of *falciparum* infections. He advocates the administration of quinine in doses that are seldom given nowadays. Representative cases are described. The diagnosis having been established an intravenous injection of 2·0 gm. of quinine is given and followed, during the first 24 hours, by three intramuscular injections each containing 1 gm. of quinine. During the second and third

days four injections each containing 1 gm. of quinine are given, each day: one of these four injections is usually intravenous, the others intramuscular. Further treatment depends on the progress of the case; it is continued on the same heroic scale when necessary. Such doses, the author states, have been well tolerated. Such treatment kills all forms of the parasite and prevents relapse. *N. W.*

MÜLLER-OSTEN (Wolfgang). Die Behandlung der Malaria und ihre Verhütung in der Kriegsmarine in den Jahren 1920–1935. (Zugleich ein Beitrag zur Frage der Kriegsmalaria.)—Reprinted from *Deut. Militärarzt.* 1937. Vol. 2. No. 1. pp. 25–35. [31 refs.]

SAUTET (J.). A propos du traitement du paludisme par les dérivés de la dihydroquinamine. [**Treatment of Malaria with Derivatives of Dihydroquinamine.**]—*Bull. Soc. Path. Exot.* 1937. June 9. Vol. 30. No. 6. pp. 461–467.

This note records the results of treatment of 4 cases of malaria by intramuscular injections of dihydroquinamine derivatives and of ten cases treated by these derivatives in tablet form. Nausea and gastralgia, attributable to the injections, detract from the value of this form of treatment which otherwise gave good results. The tablets were for the most part quite ineffective. *N. W.*

CHOPRA (R. N.), HAYTER (R. T. M.) & SEN (B.). **A Comparative Study of the Action of Atebrin and Atebrin-Plasmochin Combination on Indian Strains of Malaria. Part II.**—*Indian Med. Gaz.* 1937. Aug. Vol. 72. No. 8. pp. 458–462.

A record of the treatment of 45 cases of malaria with atebrin-plasmoquine dragées, atebrin 0·1 gm. and plasmoquine 0·005 gm. The usual dose for an adult was one dragée three times a day for five consecutive days. Of these cases 14 were *vivax* infections, 20 *falciparum*, 3 *malariae* and 8 mixed. The results of treatment were compared with those obtained in another series of 37 cases treated with atebrin alone. The following conclusions are reached. In cases of benign tertian the combination is no more effective than atebrin alone as judged by the rapidity of the disappearance of parasites from the blood stream. In malignant tertian cases the combination is more effective. Relapses are less frequent when the combined drugs have been administered: the number of cases treated was small. Both methods of treatment are of equal value with regard to reduction in the size of the spleen. The combination of the two drugs is more toxic than is atebrin alone. The combination has distinct advantages in the treatment of malignant tertian cases, especially if crescents be present, but has no particular advantages in the treatment of benign tertian and quartan cases. *N. W.*

NAYUDU (R. V. N.). **Malaria and its Treatment by the Synthetic Remedies: Atebrin and Plasmochin.**—*Indian Med. Gaz.* 1937. Sept. Vol. 72. No. 9. pp. 531–532.

A record of the treatment of 187 patients suffering from malaria, mostly benign tertian, with atebrin for five days followed by plasmoquine for five days, in the usual doses. The results were good.

N. W.

CABRAL (Joaquim). Observações sobre a acção do M3 na cura da malária crónica. [**The Action of M3 in the Treatment of Chronic Malaria.**]—*Bol. Geral. Med. e Farm.* 1937. May, June & July. Ser. 19. Nos. 5, 6 & 7. pp. 136–158.

M3 contains manganese and mercury, in the form of a double iodide, combined with spleen extract. The mercury is credited with immunizing activity whilst the manganese and spleen extracts stimulate red cell formation, promote the formation of antibodies and thus combat anaemia and malaria cachexia. This paper recapitulates at length the results reported by PERINI which prompted the author to undertake the experimental treatment of thirteen cases of chronic malaria in Goa, details of which are given. Symptoms of drug intolerance were observed in half the cases, bilious vomiting, diarrhoea and albuminuria; in one case the treatment had to be stopped. The conclusion arrived at is that M3 can be considered as helpful in the treatment of chronic malaria, by improving general nutrition and anaemia and effecting reduction in the size of the spleen, but that it cannot be relied on as a gametocide or as a preventive of relapse. *N. W.*

PETER (F. M.). Die synthetischen Malariamittel.—Reprinted from *Ergebnisse der Hygiene Bakteriologie Immunitätsf. u. Experim. Therap.* 1937. Vol. 19. pp. 88–126. [8 pages of refs.]

GONGGRIJP (L.) & SOEDIGDO (R.). Atebrine- en kinineverstrekking in een chronisch endemisch malariagebied.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1937. June 15. Vol. 77. No. 24. pp. 1471–1477.

EJERCITO (Antonio) & SANTOS (Gregorio O.). **The Philippine Totaquina in the Treatment of Human Malaria: Preliminary Report.**—*Monthly Bull. Bureau of Health.* Manila. 1937. June. Vol. 17. No. 6. pp. 219–240. With 5 graphs.

This is a record of the treatment of 74 cases of malaria with totaquina and 152 cases treated with quinine, all adults. The Philippine totaquina used is of Type I, that is, the total alkaloids extracted from the bark of either *C. succirubra* or *C. robusta*: it was given in doses of 0·5 gm. four times a day. The quinine sulphate was given in tablet form, five grains four times a day. The results show that there is very little difference in the therapeutic value of the two methods of treatment. Totaquina in the doses used was well tolerated. *N. W.*

ARACTINGI (Joseph). Essai de toxino-thérapie antipaludique. [**Experimental Toxin-Therapy of Malaria.**]—*Rev. Méd. et Hyg. Trop.* 1937. May–June. Vol. 29. No. 3. pp. 176–178.

On the supposition that the blood of a patient suffering from malaria contains a toxin excreted by the malaria parasite, the author of this note injected subcutaneously 10 cc. of the patient's whole blood, with the idea of provoking the formation of antibodies that might act on the parasites enclosed in the spleen. The blood was extracted and the injections made during fever-free intervals. The experiment was made on a hundred malaria patients in an intensely malarious village, Gozlanie, about 19 miles south-east of Damascus. Most of the infections were *vivax*; *falciparum* infections were rare. Each

patient received four injections at intervals of from three to five days. All the cases were old infections. In 80 of the cases fever ceased after the third injection. They were kept under observation for seven months: none of them had a relapse and their health was excellent. In 15 cases the fever ceased after the fourth injection but there was a mild return of fever some twenty days later. Five patients who had continued fever derived no benefit from the treatment: they were given subsequently intramuscular injections of quinine. *N. W.*

PRESCRIBER. 1937. Nov. Vol. 31. No. 11. pp. 355–367. [57 refs.]—The Treatment of Malaria. A Year's Progress.

CIUCA (M.), BALLIF (L.), CHELARESCU (M.), ISANOS (M.) & GLASER (L.). **On Drug Prophylaxis in Therapeutic Malaria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. July 31. Vol. 31. No. 2. pp. 241–244.

The observations reported in this paper are concerned with 45 patients infected therapeutically, mostly by infected mosquitoes, with either *Pl. falciparum* or *Pl. vivax*. Of 12 persons exposed to infection with *falciparum* and given daily prophylactic doses of atebrin, 0·3 gm., over a period of 11 days, not one became infected; of 14 similar cases but given prophylactic quinine, 1·0 gm. a day, for the same period, only one gave evidence of infection and then only by showing parasites without fever after 46 days' incubation. Of five controls three acquired definite infection, fever and parasites, and two became parasite carriers. Of the *vivax* cases four treated with atebrin remained free from infection; of three treated with quinine one became infected; of seven controls, three showed parasites and fever, three parasites alone and one was immune.

The authors consider that the therapeutic action of these drugs is upon the schizogonic forms of the parasite and not upon the sporozoites or any intermediate stages. In *falciparum* infections an interval of 5 days elapses between infection and the appearance of schizogonic forms in the blood. *N. W.*

OGANOV (L. I.), YEFIMOV (I. A.) & MILOVZOROVA (E. I.). **Acriquine as an Anti-Malarial Prophylactic.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 2. [In Russian pp. 209–214. English summary p. 214.]

"1. Small doses of acriquine, 0·4–1·2, altogether taken over a period of 2 to 22 days affords no protection against the invasion of sporozoites.

"2. In doses of 0·4 g. given every 10 days under clinical conditions during one summer season it had a good prophylactic effect. Not a single case of malaria occurred in the group who took this treatment faithfully whereas among those who took it irregularly, there were 2 cases of malaria, a morbidity rate of 2·6 per cent. In the parasite survey during the autumn, no parasites were observed in any of the persons who had taken acriquine, whereas in the control groups (those who had received no acriquine at all) there was a 6·4 per cent. rate of primary infection.

"3. By successfully suppressing the clinical symptoms of primary and recurrent attacks, which are inescapably bound up with the appearance of gametocytes in the blood, acriquine may be used to lower the infectivity of mosquitoes."

JALALYAN (Z. A.) & KARASEVA (O. A.). **Acriquine as an Anti-Malarial Prophylactic.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 2. [In Russian pp. 215–219. English summary p. 219.]

"The authors administered acriquine as a prophylactic measure, with the following results: among the 127 persons taking the drug, 4 individuals, or 3·1 per cent., came down with malaria during the prophylactic period, while among the 114 controls, 15 persons, or 13·2 per cent., became ill. The authors conclude that the Soviet preparation acriquine may safely replace quinine as a prophylactic against malaria, and may even be preferred to the latter for this purpose since it does not have any of the secondary ill effects of quinine."

RACHINA (M. G.), MILJUTINA (E. T.), KOGAN (A. G.) & ELISSÉEVA (S. I.). Efficacité comparée du traitement préventif des rechutes par l'acriquine et la quinine appliquées à différentes périodes.—[**Comparative Value of Acriquine and Quinine, administered at Different Periods, in the Prevention of Relapses of Malaria.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 2. [In Russian pp. 155–179. With 5 figs. French summary pp. 179–180.]

In Russia considerable attention is given to treatment, designed to prevent relapse, of those persons who have suffered from malaria in the previous year. Four thousand persons, adults and children, who suffered from malaria during 1935 were kept under observation. These were divided into four groups. The first group received treatment, half with acriquine the other half with quinine, from February 1st to March 1st, 1936. The second group was treated similarly from March 15th to April 15th. The third group was treated from April 15th to May 15th. The fourth group, serving as a control, received no treatment. Acriquine was given daily for five days, then a ten-day interval, then daily for three days followed by a second ten-day interval and a final three-day course of the drug. The daily dose of acriquine was 0·20 gm. for adults, 0·15 for school-children. Sulphate of quinine was given three days consecutively, followed by an interval of four days; this was repeated three times. The daily adult dose of quinine was 1·0 gm.; for school children 0·6 gm. Monthly blood examinations were made of all from January to October and malaria attacks were carefully registered. In the first group the relapse rates, up to July 1st, were, acriquine 8·2 per cent., quinine, 6·4. In the second group these rates were 3·9 and 10·2: in the third group 1·4 and 3·1. In the control group the relapse rate was 14·6 per cent. The authors conclude that the efficiency of such treatment depends on the time of year at which it is administered: if treatment be begun a few days before the annual wave of benign tertian relapses it can prevent such relapse and is beneficial to the patient's health. It reduces the number of acute attacks of fever and the days of incapacity for work.

N. W.

RADVAN (I.), ALEXANDRESCU (D.) & STEFANESCO (S.). Mode d'action de l'acaprine sur la rate. II. Action de l'acaprine sur la glycémie. **[The Action of Acaprine on the Spleen: its Influence on Glycaemia.]** —*Bull. Soc. Path. Exot.* 1937. June 9. Vol. 30. No. 6. pp. 467–469.

—— & ——. Influence de l'acaprine sur l'appareil cardio-vasculaire et le tonus végétatif. **[Influence of Acaprine on the Cardio-Vascular System.]**—*Ibid.* pp. 470–472.

—— & ——. Influence de l'acaprine sur la teneur du sang circulant en éléments figurés. Participation possible du système réticulo-endothélial. **[Influence of Acaprine on the Formed Elements of the Peripheral Blood and the Possible Participation of the Reticulo-Endothelial System.]**—*Ibid.* pp. 472–475.

The favourable results obtained by the authors in the treatment of malarial splenomegaly by acaprine induced them to study the mode of action of the drug, the results of which study are reported in these papers. The action of the drug was studied on normal subjects, on an individual who had undergone splenectomy, and on two patients with malarial enlargement of the spleen.

In all cases acaprine produced an increased glycaemia which was very marked in five cases out of ten. The increase attained its maximum 30 minutes after the injection; it then decreased, but was still above the pre-injection level 60 or even 90 minutes after. Acaprine exercises an action analogous to that of adrenalin, either directly, by mobilizing glycogen reserves in liver and muscles, or through the intermediary of suprarenal glands by nerve stimulation.

Acaprine produced an increased radial pulse rate: the increase varied from 8 to 48. Occasionally there was an attack of tachycardia. Increase in maximum arterial tension by 10 to 25 mm. was noted: minimum tension was but little altered. The influence of acaprine on the oculo-cardiac reflex was variable.

In three normal subjects acaprine produced an increase in the numbers of red cells and platelets and a diminution in three. In the two cases with malarial splenomegaly the leucocytes were increased: this was also the case in the splenectomized subject, which indicates that the action of the drug is not confined to the spleen but extends to other lymphatic organs and reticulo-endothelial tissue elsewhere. The latter exhibited a considerable monocytosis. *N. W.*

JOYEUX (B.), GUICHARD & POILANE. L'*Hymenodictyon excelsum velutinum* du Tonkin. **[The *Hymenodictyon excelsum velutinum* of Tonking.]**—*Ann. de Méd et de Pharm. Colon.* 1937. Jan.–Feb.–Mar. Vol. 35. No. 1. pp. 238–248. With 4 figs.

Hymenodictyon excelsum velutinum is a tree closely related to *Cinchona*. It was discovered in Indo-China by Balansa about 1881. After the death of that botanist it received no attention till it was rediscovered in Tonking in 1936 by the authors of this paper, growing in abundance, near the frontier of Annam and Laos, in valleys and in all cases at low altitudes. Observations now in progress may be of value from the point of view of *Cinchona* cultivation. The bark of *Hymenodictyon* contains neither quinine nor any other alkaloid.

N. W.

TIBOURSKAJA (N. A.). La plasmocide comme moyen gamétocide. [**The Value of Plasmocide as a Gametocide.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 2. [In Russian pp. 181–206. [51 refs.] French summary pp. 206–208.]

The object of the experiments described in this paper was to determine the minimum daily dose of plasmocide necessary to render the human gametocyte carrier incapable of infecting mosquitoes and the duration of this effect after the discontinuation of the drug. The experiments were carried out on a considerable scale and involved the dissection of more than four thousand mosquitoes. The practical conclusion that the author draws from his observations is as follows. All gametocyte carriers should be given 0·09 gm. (0·03 gm. three times a day) of plasmocide every third day as long as gametocytes can be found in the peripheral blood and for some days after. The latter precaution is considered necessary because cases have been observed in which only one gametocyte was found per 500 leucocytes and which were, nevertheless, capable of infecting mosquitoes. The author further considers that all patients harbouring malaria parasites should be given plasmocide in addition to quinine or acriquine.

N. W.

LORANDO (N.) & SOTERIADES (D.). **Treatment of Malaria with Immune Blood.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. July 31. Vol. 31. No. 2. pp. 227–234. [14 refs.]

The authors have previously reported favourable results in the treatment of children suffering from malaria, in a highly endemic part of Greece, by the subcutaneous injection of maternal whole blood (this *Bulletin*, 1937, Vol. 34, p. 63). The present paper confirms the favourable results obtained by this method of treatment, twenty further successful cases being reported. In some cases the haemotherapy was reinforced by the administration of small doses of quinine; it is not easy to find sufferers from malaria in Greece who have not taken some quinine. Nine patients, however, had not taken any quinine and in these clinical cure was effected by haemotherapy alone. The temperature drops rapidly after the subcutaneous injection of whole immune blood and the volume of the spleen rapidly diminishes. Many of the patients have remained free from fever for a long period of time after treatment in spite of residence in areas in which exposure to reinfection is certain.

This paper also contains information regarding the past and present prevalence of malaria in the Marathon District where these patients have been treated.

N. W.

MARCIALIS (I.) & CANNAS (E.). Il metodo di Maurizio Ascoli nella cura della splenomegalia malarica nell'infanzia. [**Ascoli's Method in the Treatment of Malarial Splenomegaly of Infants.**]—*Pediatria.* 1937. Aug. 1. Vol. 45. No. 8. pp. 697–705. [23 refs.]

This paper underlines the importance of malaria as a cause of ill-health and of retarded development of infants and young children in Sardinia and describes the treatment of 15 cases of malarial splenomegaly in children aged from 2½ to 9 years by the intravenous injection of adrenalin. In the smaller children intramuscular injections were

sometimes substituted. In only a few cases was the full course of 30 injections necessary ; in most they were limited to 20. The treatment was well tolerated and the results satisfactory as regards diminution of the size of the spleen, increase in the red blood cell count and of the haemoglobin index and improvement of the general condition of the children. *N. W.*

CHMÉLOVA (J.) & SCHLONOVA (M.). Contrôle entomologique direct de l'efficacité des moustiquaires des lits et du grillage. [**Direct Entomological Control of the Efficiency of Mosquito Nets and Metallic Screening.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 2. [In Russian pp. 250–257. With 5 figs. French summary p. 258.]

This describes the methods used to determine the efficiency of the mechanical means adopted to protect the workers of the Ozeretzk peat works, near Moscow, from mosquito bites. The criteria of efficiency of " screening " are the number of mosquitoes captured by hand in the protected dwelling and the number caught in a trap at the exit. The number caught in a trap at the entry gives an idea of the number trying to get in. The protection afforded by mosquito nets is indicated by the percentage of mosquitoes engorged, and with eggs, of those caught in a trap at the exit and by the number caught under the nets at the morning inspection. The number of mosquitoes that succeed in entering the protected house is ten times less than the number entering control houses and even if the protection be incompletely carried out, without springs to the doors for example, the infestation of dwellings with mosquitoes is greatly diminished. The use of the mosquito net halves the number of mosquitoes found engorged in the barracks. The use of metallic screening combined with the use of mosquito nets gives very considerable protection but the necessity of killing all adult mosquitoes found in dwellings should not be overlooked. *N. W.*

FIELD (J. W.), NIVEN (J. C.) & HODGKIN (E. P.). **The Prevention of Malaria in the Field by the Use of Quinine and Atebrin. Experiments in Clinical Prophylaxis.**—*Bull. Health Organisation.* (League of Nations.) 1937. Apr. Vol. 6. No. 2. pp. 236–290. With 11 figs. & 1 map.

These experiments, designed to supplement existing knowledge regarding the efficacy and safety of quinine and atebrin, administered in regular doses over long periods, as clinical prophylactics of malaria, were carried out by the Institute for Medical Research, Federated Malay States. They are a part of a coordinated scheme of research organized by the Malaria Commission of the Health Organization of the League of Nations. The experiments were made in the State of Selangor, in a tea plantation with intense endemic malaria, where there was no mosquito control, and in a rubber plantation with malaria of mild endemicity in which antilarval measures are only partially effective. The labour populations concerned were immigrants from South India. In the tea plantation the vector was *A. umbrosus* and the predominant parasite *Pl. vivax.* In the rubber plantation the vectors were *A. maculatus* and *A. umbrosus* and the predominant parasite *Pl. falciparum.* The manner in which the work was carried

out and the observations controlled makes this report of unusual interest. This is especially true of the work in the tea plantation. The results are admirably presented.

The experiment lasted from August 1935 to October 1936. Observations were made on 1,253 individuals. The populations were divided into three strictly comparable groups. Members of the first group each received atebrin, 0·2 gm., on two successive days of each week. To members of the second group 0·4 gm. of quinine bihydrochloride was given daily. Members of the third or control group were given an inert substance. The doses mentioned are for adults: children received smaller doses according to age. Both atebrin and quinine effected a marked reduction in the number of attacks of malaria. During the last six months of the experiment the reduction amounted almost to elimination. Atebrin exercised a more potent effect on the malaria incidence and on parasite rates than did quinine. When the administration of drugs was suspended there was a rapid reappearance of clinical malaria, two weeks earlier in the quinine group than in the atebrin group. This post-prophylaxis malaria was apparently due to infections that had been clinically and, in many cases, parasitologically hidden by the prophylactic treatment. The action of the drugs was in effect to prolong the incubation period up to as long as one year. Cases were almost twice as numerous in the quinine and atebrin groups as in the control group during the two months following the cessation of prophylaxis.

The risks attendant upon this prolonged use of atebrin are very slight. Two members of the atebrin groups who died had extensive liver damage; in neither case was it possible either to incriminate or exonerate atebrin in determining the fatal issue. In pregnant women, in an intensely malarial region, atebrin appears to improve the prospects of a "live-birth."

Space precludes reference to many other facts of interest in an interesting and informative report. *N. W.*

Hill (Roy A.) & Goodwin (M. H.), Jr. **Comparative Drug Prophylaxis Survey of Malaria. Preliminary Report.**—Reprinted from *Jl. Med. Assoc. Georgia.* 1937. May. Vol. 26. No. 5. pp. 179–182.

This is a study of the relative value of atebrin and quinine as prophylactics. The observations were made on a population of 337 living on a 16,000 acre plantation and all exposed to malaria infection. The atebrin group consisted of 109 persons each of whom received 1½ grains of atebrin three times a week: 108 persons in the quinine group received 10 grains of quinine daily: the control group numbered 120. The observations continued throughout the summer. The percentage of new infections in the atebrin group was 1·8, in the quinine group 5·5 and in the control group 31·6. The authors consider atebrin superior to quinine as a prophylactic and in the treatment of malaria. No reference is made to the species of parasite. *N. W.*

Gosio (B.). Considerazioni tecniche d'attualità sul trattamento profilattico e curativo della malaria.—*Terapia.* Milan. 1936. Apr. Vol. 26. No. 202. pp. 97–104.

Sbrighi (Cenno). Tratamento e profilaxia do impaludismo.—*Hospital.* Rio de Janeiro. 1937. Oct. Vol. 12. No. 4. pp. 657–670.

MORIN (Henry G. S.) & MARTIN (P.). Notions générales sur l'utilisation des poissons à la lutte contre les moustiques. [**The Employment of Fish as an Antilarval Measure.**]—*Arch. Inst. Pasteur d'Indochine.* 1936. Oct. Vol. 6. No. 24. pp. 443–461. With 4 figs. on 1 plate.

A review of the general principles governing the use of larvivorous fish with practical details on maintaining a supply of *Gambusia affinis* and *Girardinus goupyii.*

The authors give an historical review on the use of fish for malaria control, with lists of the species which have been employed in different countries, together with a detailed summary of the methods developed in Java in the salt water and fresh water fishponds. In general, the species selected should be of small size, carnivorous, viviparous and adaptable to all kinds of water. Before liberating the fish in the mosquito breeding places the authors recommend maintaining them in several pools of different character (clear, cloudy, fouled by cattle, etc.) with frequent changing over. In this way vast numbers of an exceedingly vigorous race will be available for dispersal in about a year. Where the fish are bred in small concrete tanks they need constant attention. It is seldom that the use of fish alone is an adequate method of control, but they form a valuable supplement for other means such as Paris green. *V. B. Wigglesworth.*

ANTSCHELEWITSCH (W. D.). Transfusion von konserviertem Malarikerblut. [**Transfusion of Preserved Blood infected with Malaria.**]—*Folia Haematologica.* 1937. Vol. 57. No. 4. pp. 406–416. [31 refs.]

The important practical problem which the author set himself to solve was the determination of the period which the malarial plasmodium can live in preserved blood before being destroyed. For his observations he employed the following solutions for the preservation of the blood: (1) Glucose citrate, consisting of 2 parts of a 3·8 per cent. sol. of sod. cit. and 5 parts of a 5·4 per cent. sol. of glucose. Three parts of blood are mixed with seven parts of this solution. (2) Normal citrate, consisting of 0·5 parts of a 5 per cent. sod. citrate sol. and 5 parts normal saline, to this quantity 4·5 parts of blood are added. (3) A solution known under the name of I.P.K. of Balachowski, consisting of 5 parts sod. cit., 7 parts sod. chloride, 0·04 parts magnesium sulphate and 0·2 parts pot. chloride in 1,000 parts of double distilled water. Blood is mixed with this solution in varying amounts. Freshly drawn blood from patients suffering from malaria was added to the above 3 solutions. The blood was taken from 40 cases of malaria, of whom 16 suffered from malignant tertian, 22 from benign tertian and 2 from quartan. The changes of the parasites in the solutions were studied microscopically daily in thick and thin films stained by Giemsa up to 30 days. In addition to the microscopical examination, the stored malarial blood, which had been observed for various periods, was injected intravenously into patients with general paralysis, etc., using mostly the benign tertian for the purpose. In all 92 cases were infected.

The author concludes from his investigations that: (1) The parasites are more quickly destroyed in blood preserved in the citrate and I.P.K. solutions than in the glucose solution. (2) The I.P.K. and citrate solutions damage the red cells less than the glucose solution. (3) In

blood preserved in the ice-chest the non-sexual forms of the benign tertian show changes in morphology first, being markedly altered in 5 days, whilst this change is not seen in the gametocytes till 7–8 days. (4) The gametocytes of malignant tertian parasite are not destroyed till the 8–10th day of storage. (5) The parasites of quartan malaria only show signs of degeneration at the end of the first 5-day interval. (6) In all three varieties, even after prolonged storage of the blood, the parasites are located inside the red cells. (7) The danger of infection is real in a transfusion from a donor suffering from benign tertian malaria, whether active or latent. (8) According to the observations the danger of infection of the patient with malaria *is present up to the 8th day of storage of the blood*, 59 per cent. of the infections occurred in the first three days of storage, while the remaining 41 per cent. occurred in the 5 following days.

As malaria is a world-wide infection and as blood transfusions are becoming more frequently employed as a therapeutic measure this paper is of considerable practical importance. It is also interesting from the point of view of the transmission of malarial blood for purposes of malaria therapy. *E. D. W. Greig.*

CALCUTTA: ANNUAL REPORT OF THE ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, 1936 [STEWART (A. D.), Director]. —[**Malaria** pp. 29–31] [KRISHNAN (K. V.)].

In addition to teaching a certain amount of research work was carried out. An investigation was begun to determine the factors responsible for the relative failure of *A. culicifacies* as a vector of malaria in Bengal; elsewhere in India it is a vector of paramount importance. The Bengal variety is easily infected experimentally, but its seasonal prevalence was found to be very restricted at Abujhati, where there is a field malaria station. Larvae appeared in January and were found up to March: adults were captured during the same months. After March neither larvae nor adults could be found. From January to March the gametocyte carrier rate is low and conditions are not favourable for the completion of the sexual cycle of the malaria parasite in the mosquito. Imported *culicifacies* eggs could be bred out from July to December in clear water over a layer of sand, but in the muddy water with the aquatic vegetation common in Bengal breeding was very difficult. The investigation is being continued.

Observations were made regarding the value of the "Entoray" as a mosquito trap. The Entoray consists of a quartz mercury vapour lamp and a suction pump. The lamp is said to attract mosquitoes: this was verified by experiment but a powerful electric lamp used as a control attracted almost as many. The radiations from the lamp had no lethal effect on mosquitoes at distances over three feet.

N. W.

RICE (J. B.) & BARBER (M. A.). **A Comparison of Certain Species of Anopheles with Respect to the Transmission of Malaria.**—*Amer. Jl. Hyg.* 1937. July. Vol. 26. No. 1. pp. 162–174. With 1 chart.

This is a comparison of *A. elutus*, *A. maculipennis* (*typicus* and *messeae*), and *A. superpictus* with regard to their relative importance

as vectors of malaria and an interesting discussion of the factors which might explain their varying degrees of importance in this regard. It is based, for the most part, on observations made in Greek Macedonia, but reference is also made to observations on *elutus* and *superpictus* in Cyprus. During the warmer months, when malaria transmission is most active, *elutus* is more apt to use houses as daylight resting places than is *maculipennis*—the ratio of densities, *elutus* : *maculipennis*, being, 1 : 0·4 in houses as compared with 1 : 1·4 in stables. The seasonal prevalence of these two species is very similar but *maculipennis* reaches its maximum prevalence about a month earlier than *elutus* and begins to decline earlier. The sporozoite index, based on dissections made during four years, was *elutus* (24,549 dissections), 1·34 ; *maculipennis* (15,451 dissections), 0·08. A more significant comparison is based on the dissection of the two species collected on the same day in the same house or stable, at least one sporozoite-positive mosquito, of one or other species, being found on that day, indicating the presence of an effective gametocyte carrier in the vicinity. Of such, 1,457 *elutus* and 1,311 *maculipennis* were dissected ; the sporozoite indexes were : *elutus* 7·7, *maculipennis* 0·30. In the laboratory both species are equally susceptible to infection. The longevity of both species is approximately the same. Precipitin tests have shown that *elutus* has a much greater partiality for human blood than has *maculipennis*, or, rather, *maculipennis* and *superpictus* are attracted to domestic animals whereas *elutus* is indifferent as regards choice of human or domestic animal sources of blood. This was shown experimentally. The climatic environment of the host does not appear to be a factor of any importance in determining the choice of host.

A. superpictus plays a very minor rôle in the transmission of malaria in this part of Macedonia even though the sporozoite index may be high. This may be explained by the shortness of the *superpictus* season and the fact that the proportion of degenerated sporozoites is much higher in *superpictus* than in *elutus*. Blood ingested by *superpictus* takes longer to clot than in *elutus* and *maculipennis* and precipitable serum disappears more quickly. *N. W.*

SPRUE.

* FAIRLEY (N. Hamilton). **Tropical Sprue with Special Reference to Intestinal Absorption. Part I.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. June 30. Vol. 30. No. 1. pp. 9–32. With 9 graphs. [28 refs.]

Dr. N. Hamilton Fairley expressed the opinion that the difficulty of dealing with the subject of tropical sprue had been increased by the tendency to identify coeliac disease, idiopathic steatorrhoea and non-tropical sprue as one and the same disease. Coeliac disease was essentially a malady of early childhood, but adults were occasionally found who gave a history of prolonged intestinal disturbance in childhood and presented bony deformities and steatorrhoea in adult life. Other patients with steatorrhoea were encountered who enjoyed a healthy childhood and who had never been to the tropics. The term non-tropical sprue was applicable here but this condition differed from tropical sprue in the severity of its clinical manifestations, in the gravity of the prognosis and in its poor response to a therapeutic régime which resulted in patients with tropical sprue attaining robust health. Similarly, a tendency to identify sprue and pernicious anaemia merely on the grounds that megalocytic anaemia was a manifestation common to both diseases still existed, and throughout the paper certain essential differences in their pathology, symptomatology, biochemistry and response to treatment were stressed. Otherwise the lecturer confined his remarks to tropical sprue.

In regard to pathology the recent conclusion of THAYSEN that many of the intestinal lesions previously described at autopsy were due to necrobiotic changes had been confirmed by Fairley and MACKIE in a series of post-mortem examinations made within a short time of death. Atrophy of the viscera was characteristic, the average percentage decrease in the liver equalling 27·2 per cent., the kidneys 20·5 per cent., the heart 34·1 per cent., and the spleen 35 per cent. The heart was generally small and showed brown atrophy in contradistinction to the large heart presenting fatty degeneration found in Addisonian pernicious anaemia. In both diseases megaloblastic hyperplasia of the red marrow occurred, but in sprue fatty marrow persisting in the long bones often showed a peculiar gelatinous appearance similar to that seen in certain nutritional diseases and starvation.

Biochemical and other data founded on personal observation and relating to defective absorption of food constituents were then reviewed.

In tropical sprue steatorrhoea was the most outstanding feature and a single fat analysis of the stools had revealed a total fat value exceeding 25 per cent. of the dried faeces in 56 out of 70 consecutive cases. With recovery the faecal fat was reduced to normal levels. Hypocalcaemia was a frequent finding and in 80 cases the total blood calcium equalled 8·8 mgm. per 100 cc. Eleven cases presented tetany

*At a meeting of the Royal Society of Tropical Medicine and Hygiene, held on the 21st May, 1936, papers were read on tropical sprue and coeliac disease, with special reference to intestinal absorption, and a discussion by various authorities followed. Interest in the subject was considerably enhanced by the recent tendency in America and on the Continent to identify coeliac disease, idiopathic steatorrhoea and tropical sprue and to consider avitaminosis the aetiological factor involved.

and in these values ranged from 5·1 to 7·0 mgm. The blood phosphorus was normal or decreased, and varied from 1·6 to 4·0 mgm. per 100 cc., a finding which indicated that hypocalcaemia arose from defective intestinal absorption. Carbohydrate metabolism was also affected. In a series of 50 cases, flat glucose curves or curves showing a sub-maximal or a delayed maximal rise were demonstrated. Such results had been attributed by Thaysen to an increased rate of removal of sugar from the blood caused by endocrine disturbances, and by HIMSWORTH to a hypersensitivity to insulin resulting from compensatory excessive carbohydrate intake under conditions in which fat was being poorly absorbed. Fairley and BROMFIELD regarded defective absorption of glucose to be responsible. To test these views an intravenous glucose test had been devised; cases of tropical sprue all showed high intravenous curves compared with the normal and a definite delay in the return to the fasting sugar level. On recovery the curves were found to approximate closely to the normal. This sluggish utilization of sugar injected intravenously, indicating as it did a decreased sensitivity to insulin, must be attributed to defective absorption of glucose which was also the explanation of the flat and delayed oral glucose curves so characteristic of well established cases of this disease. It followed that intravenous glucose and insulin were both indicated in gravely ill patients. In the author's opinion it was the fermentation of this unabsorbed glucose which gave rise to intestinal distension and flatulence and the gaseous acid features of the stool, just as it was the unabsorbed fat which accounted for its greasy, bulky character. The calcium in the gut probably united with excess of fatty acids to form insoluble calcium soaps, and loss of calcium resulted. Defective absorption of vitamin D might also be a factor in the production of hypocalcaemia. Treatment of tetany with calcium *per os* was, however, often ineffective until the fat content of the stools had been markedly reduced by decreasing the fat content of the food.

Amino-acids derived from proteins appeared to be well absorbed and there was much less evidence of defective absorption of vitamins in tropical sprue than in either coeliac disease or non-tropical sprue. The possible relationship of fat soluble D to the genesis of hypocalcaemia and tetany have already been considered, but no evidence was available that fat soluble A and E were implicated. Similarly the mild neuritic features encountered in tropical sprue might be due to defective absorption of vitamin B_1 and the infrequent purpuric manifestations to defective absorption of vitamin C. In the author's series, study of the dietary in patients prior to and at the time they developed sprue failed to support the view that avitaminosis was a primary factor in the aetiology of this disease.

N. Hamilton Fairley.

Ross (C. Wallace). **Intestinal Absorption in Coeliac Disease, with Some Remarks on the Effect of Liver Extracts upon Carbohydrate Metabolism.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. June 30. Vol. 30. No. 1. pp. 33–50. With 17 figs. [12 refs.] Discussion pp. 51–60. With 2 figs.

Dr. Ross pointed out that the recognition of coeliac disease as a condition of disordered absorption lagged many years behind its first masterly clinical description by Samuel GEE in 1888. Inability to

absorb fat and the products of its digestion was the keynote of the disorder. PARSONS laid down that the daily output of fat should exceed 2 grammes in the stools (usually found when the dried faeces contain more than 25 per cent. of fat) before a diagnosis of coeliac disease was justified.

Steatorrhoea leads to a heavy loss of calcium and to great difficulty in absorbing vitamin D. It is not surprising then that rickets and tetany should be common, and some degree of osteoporosis almost inevitable. Low blood calcium and phosphorus values were found. Scurvy indicating vitamin C deficiency was by no means rare, but evidence of A deficiency was more uncertain. Only two cases complicated by xerophthalmia had been recorded.

Protein was absorbed reasonably well, and p.a. factor also. Macrocytic anaemia was extremely rare. On the other hand most cases of coeliac disease showed a mild degree of anaemia of hypochromic type responding easily to iron therapy.

Dr. Ross then dealt with carbohydrate absorption which was the main theme of his paper. There were three explanations for the flat oral glucose-tolerance curves found in coeliac disease—namely an endocrine disturbance (MACLEAN, SULLIVAN, THAYSEN and others), and excessive tolerance for sugar based on a high carbohydrate intake (HIMSWORTH) and a simple absorptive deficiency (MARFAN, PARSONS and others). An analysis of the author's own series of intravenous and oral glucose-tolerance curves and insulin depression curves showed (1) the association of high intravenous curves with flat oral ones, (2) the possibility of reducing these high intravenous curves towards normal by giving glucose intravenously for some time, and (3) the existence of a state of relative insensitivity to insulin in coeliac disease, comparable to that of a normal person on a low carbohydrate diet. These findings all constituted sound evidence of an absorptive deficiency for carbohydrate. Analysis of a number of intravenous glucose-tolerance curves before and after injections with campolon, anahaemin or liver extract were made in coeliac disease, in cases of chronic intestinal indigestion without steatorrhoea, in abdominal tuberculosis and in hepatic cirrhosis. The findings suggest that total liver extract contains a factor, possibly identical with Himsworth's "insulin kinase," which is capable of improving the glucose tolerance or sensitivity to insulin when this is impaired either by deprivation of carbohydrate or by liver disease. This factor is not considered to be identical with Castle's anti-anaemic factor and is not present, to any great extent at least, in anahaemin (Dakin and West's fraction). At present there was no evidence that this factor affects intestinal absorption.

In the discussion which followed, Professor L. G. PARSONS stated that he saw no essential difference between coeliac disease in childhood and idiopathic steatorrhoea in adults. There were, however, haematological differences between coeliac disease and tropical sprue. Apart from occasional instances of megalocytic anaemia and glossitis there was no connexion between pernicious anaemia and coeliac disease in the child or adult. The observation of Ross that campolon intravenously improved the impaired glucose tolerance in coeliac disease, while anahaemin had practically no effect, was incompatible with Castle's view that pernicious anaemia and coeliac disease were conditional deficiencies caused by lack of specific reaction between extrinsic factors and intrinsic factors.

Whatever might be the ultimate cause of coeliac disease, its clinical picture was that of a deficiency disease. Yet, as Dr. Fairley had shown in tropical sprue, this was not due to any known deficiency in diet, but to malabsorption from the gut. It was starvation in a land of plenty. Not only was there defective absorption of fat, but carbohydrate was involved as well. Ross had shown that glycorrhoea was as characteristic of coeliac disease as steatorrhoea.

Dr. H. P. HIMSWORTH said that in view of the evidence now presented by Drs. Fairley and Ross, his own original suggestion concerning the origin of the low glucose tolerance curves in steatorrhoea was wrong. The absorption of glucose was an active process, whereas the other sugars, including possibly laevulose, merely diffused slowly through the intestinal wall. This might account for the different behaviour of the two sugars referred to by Professor Parsons. Dr. Fairley had brought forward convincing evidence that calcium was inadequately absorbed. It had recently been shown that calcium gluconate in the gut inhibited the absorption of glucose and there might possibly be some connexion between the two—deficient absorption of glucose in steatorrhoea and the presence of unabsorbed calcium in the intestine.

Dr. Janet VAUGHAN spoke on the idiopathic steatorrhoea of adults; she agreed that there was no essential difference between it and coeliac disease in children and that evidence of malabsorption was present in both. In nine out of eleven cases of idiopathic steatorrhoea in adults flat oral glucose curves had been found, but in contradistinction to the finding of Dr. Fairley in tropical sprue the flat curves persisted despite enormous clinical improvement. The blood picture was variable. Thus the anaemia might be (1) of hypochromic type with response to iron; (2) of megalocytic, hypochromic type with response to marmite; (3) erythroblastic. In cases responding to marmite, however, the anaemia did not arise from lack of extrinsic factor as suggested by Castle. *N. Hamilton Fairley.*

JOHANNSEN (P.). Sprueerfahrungen. [**Experiences in Sprue.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Dec. Vol. 40. No. 12. pp. 549–551.

The somewhat desultory remarks in this paper are based on the author's observations on 26 cases of sprue, seen in the Mission Hospital, Taroetoeng, Sumatra. Ten were males, 16 females; none was under 20 years of age. Three were members of the same family (brothers and sisters); three married couples were victims and in two others the disease occurred in husband and wife, but not at the same time. Five of the women and one man were attacked within 5 years of their coming to the country, none of the others had resided there for less than 10 years. Thirteen of the patients suffered from dysentery, either at the same time or previously. He has little to say regarding treatment, but stresses the point that home-treatment must never be undertaken; the first thing is to remove the patient and obtain change of environment. *H. H. S.*

STEEN (P. H. Pock). Eenige beschouwingen en observaties over de aetiologie der spruwachtige ziekten. [**Aetiology of Sprue-like Diseases.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1937. July 20. Vol. 77. No. 29. pp. 1714–1758. English summary.

"Bandoeng sprue" or "hill diarrhoea" is met with at a more or less definite height above sea level on the Preanger plateau of Java.

It is well known, however, that patients with any enteric condition suffer from all sorts of neurasthenic complaints. The question therefore at once arises: Which came first, the nervous or the bowel lesion? The nervous symptoms, as well as the diarrhoea, appear mainly in the early morning and are suggestive on first examination of hyperthyroidism, except for the low blood pressure and often a slow pulse. Paroxysmal tachycardia is, however, common. Another feature of hill diarrhoea is the occurrence of gastrointestinal crises, which is explained as due to a heightened susceptibility of the patient to the action of toxins of any sort and especially to those caused by doubtful food. Such patients are often very drug-sensitive, for example to morphine, atropine, aspirin and pyramidon. They may develop urticarias. This suggests the possibility of suprarenal insufficiency. Disturbances of lipoid and carbohydrate metabolism are the consequences which might be expected and also, in relation to protein metabolism, loss of the detoxicating action of the suprarenals. It is suprarenal insufficiency, hypoadrenalism, which the author considers is the basis of the sprue-like diseases and as explanatory of the gastrointestinal crises, the low blood pressure, the low blood sugar and the susceptibility to bacterial and pharmacological toxins. It is common to find in the history of these patients that their complaint has begun with an attack of acute dysentery. The absorbed toxin injures the susceptible suprarenal cortex and dysfunction of this gland persists after recovery from the dysentery, whereby a vicious circle is set up leading to the establishment of the clinical sprue-like condition. Suprarenal insufficiency leads in some cases to a compensatory relative hyperthyroidism and an increase in the basal metabolic rate because the suprarenal and thyroid glands are antagonistic to one another in regard to the intermediate metabolism. Disturbance of thyroid function thus brought about is followed by disturbance of gonadal function. In these general terms the author advances his theory of the causation of sprue-like diseases.

Clinical facts are also taken into consideration. Most of the patients have had their residence in a hot and humid climate. There they suffered more from a nervous than from an enteric condition. Diarrhoea sets in when leave is taken to hill stations of moderately cool climate: sprue-like diseases are endemic at the lower levels of 400 to 700 metres. Above 1,000 metres, where muscular exercise is fully indulged in, the diarrhoea and the nervous symptoms begin to improve; this is also the case with sick-leave to Europe. Explanation of these occurrences is to be found primarily in the limitations to muscular exercise imposed on the European who has become resident in a hot humid climate. Active metabolism is lowered more or less to the level of the basal metabolism. A definite relation is said to exist between muscle tone and the contractions of the voluntary muscles on the one hand, and the functional condition of the suprarenal cortex on the other. Patients with a chronic suprarenal insufficiency, as for example in Addison's disease, suffer from excessive tiredness and muscular weakness. The same applies to sufferers from sprue-like disease. Sufficiently intensive muscular exercise is apparently indispensable for the proper functioning of the suprarenals. In the absence of this stimulus the functional activity of the suprarenal diminishes. This acts in its turn back again upon the tonus of the muscles and disinclination for exercise sets in. At first the effect of dysfunction of the suprarenal is a relative hyperthyroidism with, as a result, too rapid

combustion of the glycogen of the muscles. A muscle poor in glycogen loses tonus and contractibility. Myasthenia follows.

In the case history of patients an account is often given of " pseudo-allergic " symptoms, such as bronchial asthma and hay fever. In most cases these diminish or disappear as soon as the sprue-like diarrhoea manifests itself. The relationship of sprue-like disease with allergic disturbance must then be borne in mind. It is recalled that allergic conditions, like those of sprue, may have a definite relation to meal-times. Another account, which may appear in the case history, is of skin conditions such as urticaria, eczema, deformity of the nails, etc.

A useful table of comparison is given of the consequences of suprarenal insufficiency and the corresponding symptoms of sprue-like diseases, which is intended to emphasize the close parallelism of the two conditions. This table is itself a summary of the entire argument for a specific suprarenal causation of sprue-like disease.

The treatment of the disease follows closely the theory of causation. In the first place it is necessary to institute an energetic physiotherapy. A very striking effect is produced on the nervous disturbances. Irritability diminishes and the lethargy disappears almost immediately. Improvement of the myasthenia and the tiredness are manifest. Dietetic treatment is also essential. In the diseased state, consisting of suprarenal insufficiency and compensatory hyperthyroidism, there is constant daily stimulation of the mucosae by circulating cytotoxic peptids resulting from delayed protein cleavage in the intermediate metabolism and their resistance is diminished to the entry of infecting organisms. Correction of acidity and elimination of irritating food residue, particularly cellulose, must be aimed at. A chronic enteritis inevitably gives rise to disturbances of absorption. This would apply to the absorption of vitamin-B complex and vitamin C. Considering the relation now established of ascorbic acid to the suprarenal cortex, it is not to be wondered at that this vitamin should be of therapeutic importance. After physiotherapy and diet, therefore, the author stresses the importance of treatment with yeast, reduced iron and calcium especially if liver disturbances exist. The calcium is prescribed on account of the many analogies between sprue-like diseases and allergic manifestations and to counteract acidosis. His prescription is :—calc. lactate and brewers' yeast āā 85 ; reduced iron 10. If at the same time there is achlorhydria, hydrochloric acid must be prescribed, while if acidosis is the more prominent symptom calcium carbonate instead of the lactate, and ferri carbonas in place of reduced iron are prescribed. No value attaches to the use of digestive ferments or intestinal disinfectants. Much better results are to be obtained through the use of glandular extracts and vitamin preparations and this preferably by parenteral injection, so as to get over difficulties of absorption. Glandular preparations are in the first place required to correct glandular insufficiency—tablets of suprarenal substance and cortine, gonadal extracts and parathormone. In the second place medicaments are required to counteract hyperthyroidism. These will be of the nature of drugs sedative for the sympathetic nervous system, such as ergocholin, geneserine, and octine. But the leading medicament used in sprue-like disease is a liver extract, on the assumption that this extract will neutralize excess of thyroid hormone. It is thus to be placed alongside the drugs acting specifically as sedatives on the sympathetic nervous system. A final reference is made to the injection of non-specific proteins. *W. F. Harvey.*

DAHR (Peter) & HAGEMANN (Paul). Zur Bedeutung der Bakterien- und Pilzbefunde bei Sprue. Sammelbericht an Hand eines bakteriologisch untersuchten Falles einheimischer Sprue. [**The Significance of Bacteria and Moulds in the Aetiology of Sprue.**]—*Giorn. di Batteriol. e Immunol.* 1936. Aug. Vol. 17. No. 2. pp. 145–181. [160 refs.]

The authors review the literature of the past quarter of a century on the aetiological significance of the various bacteria and moulds which have been reported as occurring in sprue. They give details of a case of non-tropical sprue observed by them in Cologne and the finding of a fungus, Blastomycetes, but the results of experimental work carried out with it have convinced them that it had played no aetiological rôle. They are thus in agreement with the best authorities on this subject. *H. H. S.*

HANSEN (K.). Einheimische—" europäische "—Sprue, ihre Symptomatologie und Pathogenese. [**Endemic or European Sprue.**]—*Deut. Med. Woch.* 1937. May 28 & June 4. Vol. 63. Nos. 22 & 23. pp. 849–853 ; 891–893. [11 refs.]

This paper deals with a subject which has recently become the focus of attention both on the part of tropical and non-tropical physicians. Endemic, European, or non-tropical sprue is by no means so rare an entity as has been supposed. Often the diagnosis of true sprue lies in the background in cases which may have been regarded as chronic pancreatitis, tetany, osteomalacia, pernicious anaemia, pellagra and scurvy. It is probable that the first cases were correctly diagnosed by RICHARTZ in 1905. Hansen considers, in view of the recent work of THAYSEN and others, that the term " symptomatic sprue " is a much more correct designation for symptom-complexes such as the fatty diarrhoea of gastro-colic fistula, mesenteric tuberculosis and disturbances of pancreatic function. The clinical picture of endemic sprue (idiopathic steatorrhoea) is next considered.

The first noticeable feature is the emaciation, and this is not accompanied by any deterioration of the higher cerebral faculties or the alertness of eye or manner. The skin is rough and parchment-like and much wrinkled. Indeed the hollowness of the eyes, the emaciation and the turgid abdomen bear a certain resemblance to allegorical pictures of the Crucifixion. The abdominal wall is of paper-thinness. There is also a patchy oedema, especially of the sacrum and feet.

The fatty stools may weigh up to 600 grams a day. Then there is a muddy-like pigmentation of the skin, which is very dry and which bears a certain resemblance to pellagra. The anaemia is never of extreme degree and may be hyperchromic and megalocytic, but often it is of a secondary hypochromic type. Tetany and osteoporosis (osteomalacia) are often also observed. The nails are brittle and ridged as in tetany. The low blood calcium content and flat sugar curve are also commented upon. The prognosis in adults is serious : in children with coeliac disease (Zöliakie) it is more favourable.

As to the exact aetiology of this illness, pathological anatomical studies have so far afforded no answer, except that the main organs show atrophy of an advanced type, together with lipoidal degeneration. There are many characteristics which are reminiscent of an avitaminosis,

and the root cause of the malady is undoubtedly some fault in fat metabolism. This in some way is connected with the calcium storage in the body—it may be that a greater part of the calcium which is excreted is in combination with fatty acids in the faeces.

The cardinal symptom is fatty diarrhoea, which is expressive of fundamental disturbance of the mechanism of fat absorption. All other symptoms are secondary to a dependence on this factor—some of them may be traced to an avitaminosis, and this in turn depends not on an insufficient vitamin supply, but on an inadequate absorption of it.

The remainder of this paper is very involved and concerns itself with theories as to the exact mechanism by which this is brought about. Considerable attention is given to the work of VERZÁR and LAST, that the essential lesion lies in some dysfunction of the suprarenal glands.

The absorption of glucose, fatty acids and flavin as well as the conversion of the provitamin B_2 into the active lactoflavin-5-phosphoric acid, is brought about by " Phosphorlierung," and this in turn depends upon the normal functioning of the suprarenals. In this manner the osteoporosis, the hypotension, the adynamia and pigmentation can be explained. *P. H. Manson-Bahr.*

BARLING (B.). **Two Cases of Idiopathic Steatorrhoea (Gee's Disease).**—*London County Council Ann. Rep. 1935.* Vol. 4. Part 3 (Med. Supp.). pp. 143–148.

Two cases are described presenting many of the features of sprue. Both were women, both had been born in London and neither had been abroad. Anaemia was present in both, in one—aged 30 years—very marked, with red corpuscles only 850,000 per cmm. and haemoglobin 27 per cent.; she suffered from attacks of fainting; the other, aged 55 years, less marked, red cells 1,600,000 and haemoglobin 36 per cent., though at one time the count was as low as 700,000 and haemoglobin 20 per cent., but in both of the macrocytic type. The serum calcium was 8·3 mgm. per cent. in the younger woman who showed definite indication of tetany: the older had only 7·7 mgm. and suffered severely from cramps, doubtless of a tetanic character. The first patient responded well to treatment with liver, high calcium and fat-free diet, but relapsed. She subsequently made a good recovery and has returned to her work. The second did not respond so well and after a rise in total erythrocytes and haemoglobin, both fell again. The diarrhoea improved on a high calcium, low fat diet. The sugar tolerance test did not show the normal curve. She has been under observation for some time, but the early improvement has not been maintained and the diarrhoea is difficult to control. *H. H. S.*

KESSLER (Emma). Ueber familiäre einheimische Sprue. [**Non-tropical Sprue; Two Cases in One Family.**]—*Schweiz. Med. Woch.* 1937. Mar. 27. Vol. 67. No. 13. pp. 269–271. With 2 figs.

Two cases are recorded, a mother and her son. The former is still living and has improved from time to time on liver treatment, the son died of pulmonary tuberculosis. The mother is aged 56 years and for the past six years has shown signs of pernicious anaemia [so says the author, but the table giving details of several blood examinations

states that there were no erythroblasts], haemoglobin as low at one time as 32 per cent. and erythrocytes 1·3 million; her weight was down to 27·7 kgm., and she passed fatty stools. In the case of the son, 28 years old, there was a history of rickets in childhood, and he suffered from fatty diarrhoea and tetany with severe anaemia: red cells 1·7 million; haemoglobin lowest 45 per cent. Improvement on liver treatment was little and death occurred from pulmonary phthisis. His anaemia was at no time as severe as that of his mother.

The author's comment is that these were two cases of typical non-tropical sprue whose symptoms were characteristic. [It is a pity that more and more cases are being reported as non-tropical sprue on totally inadequate grounds. Some, such as these, because of fatty stools and severe anaemia; others, by no means uncommonly, on the single symptom of large, pasty, fatty stools. In the present paper no analysis of the faeces was made, no sugar curves are given; although a post-mortem was performed on the son and there was history of rickets in childhood, there is no mention of examining the bones for osteoporosis which is customary in these cases. It would be well if all the usual tests and analyses were made before the authors rush into print to record more instances of "non-tropical sprue."]

H. H. S.

NUSSBRECHER (A. M.) & MORTON (F.). **Idiopathic Steatorrhoea. Report of a Case arising in Adult Life.**—*Brit. Med. Jl.* 1937. June 5. pp. 1152–1154.

THAYSEN's criteria of idiopathic steatorrhoea are: (1) Abnormally large quantity of faecal fats; (2) Normal or slightly increased nitrogen excretion; (3) Flat blood-sugar curve; (4) Raised basal metabolic rate.

The patient whose case is recorded here was a woman of 40 years, who at the age of 33 suffered from 15–20 motions daily, offensive, greyish-white and frothy. For three months she had had cramps in hands and feet, with tetany. In three years she had lost nearly 3 stone in weight (from 10 st. 12 lb. to 8 stone). On examination Chvostek's and Trousseau's signs were present together with carpo-pedal spasm, slight glossitis; serum calcium 6·8 mgm., plasma phosphorus 2·9 mgm. per cent., red cells 4,840,000, Hb. 86 per cent., C.I. 0·9; slight anisocytosis, no macrocytosis. Faeces, dried, comprised 34 per cent. total fats: neutral fats 4·8, free fatty acids 15·2 and soaps 14·1 per cent.

Three months later the condition was little changed; the glucose tolerance test gave fasting blood sugar 63 mgm. per cent.; after 50 gm. by mouth, in successive half hours 68, 76, 88, 88, 88 mgm. The basal metabolic rate was minus 5 per cent. of the normal. The stool dried contained 51 per cent. total fats: neutral fats 9·3, free fatty acids 19·7 and soaps 22 per cent. She had eight stools daily.

This patient, therefore, showed persistent fatty diarrhoea, low serum calcium, tetany, flat blood sugar curve, abdominal distension and dilatation of the colon and achlorhydria after a fractional test-meal, some glossitis, but practically no anaemia, three of the four criteria stated above. In spite of treatment with calcium, vitamin D, hydrochloric acid, and low fat diet, relapses continually recurred.

H. H. S.

LUNDSTEEN (Erling). Symptomatisk Steatorrhoea ved Carcinosis diffusa og Puerperium. [**Symptomatic Steatorrhoea in Carcinosis Diffusa and the Puerperium.**]—*Hospitalstidende.* 1937. June 22. Vol. 80. No. 25. pp. 698–706. With 3 figs. [16 refs.]

The late T. E. Hess THAYSEN classified steatorrhoea as idiopathic or symptomatic, including under the former heading coeliac disease and tropical and non-tropical sprue. The present communication does not deal with idiopathic steatorrhoea—now generally known in Denmark as Gee-Thaysen's disease—but with symptomatic steatorrhoea, two cases of which Lundsteen describes in detail. The first patient was an unmarried woman born in 1883 and developing in 1934 stools typical of sprue. During the next 18 months she lost much weight, suffered from frequent attacks of tetany, and developed hypocalcaemia, stomatitis, pigmentation of the skin and hyperchrome anaemia. The administration of sugar yielded a flat blood-sugar curve. The diagnosis of idiopathic steatorrhoea would have been almost inevitable but for the onset of violent abdominal pain, prolonged fever and ascites. This clinical picture was more suggestive of abdominal tuberculosis. A post-mortem examination excluded both diagnoses. The small intestine was studded with hard tumours, confluent or isolated, some as small as a pin's head, others as large as an almond. Ulceration with perforation of one of these tumours had given rise to the stormy picture of the acute abdomen shortly before death. In the second case, that of a married woman, aged 24, a normal pregnancy and confinement were followed by steatorrhoea, great emaciation, hyperchrome anaemia, glossitis, latent tetany and a flat blood-sugar curve. Complete recovery followed blood transfusion and the administration of extracts of stomach and liver. Lundsteen confesses to complete ignorance of the factors governing the faulty absorption of fat from the intestines in these cases, and he records them as two instructive examples of non-pancreatogen fat-diarrhoea.

C. Lillingston.

KOUWENAAR (W.). Vetdiarrhee van vegetatieven oorsprong. [**Fat Diarrhoea of Autonomic Nervous Origin.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Sept. 29. Vol. 76. No. 39. pp. 2451–2470. [28 refs.] English summary.

The occurrence in considerable number of cases of diarrhoea during the past four years in a single district and confined to Europeans is the most prominent character of the disease here described. The disease became known as " Simeloengoen disease " after the district in question, which is one situated in the foothills (200–700 m.) on the east coast of Sumatra. Actually the disease is not wholly confined to this district nor is it an entirely new disease.

Patients complain of tiredness, want of sleep, sometimes of giddiness and sweating. Although stools are occasionally thin, a true watery diarrhoea is infrequent, nor is the diarrhoea specially of morning type. Frequently blisters develop on the tongue and in the mouth. Emaciation may be a prominent feature and occasional attacks of urticaria are recorded. The faeces are light yellow, but never grey in colour and sometimes acid in odour. Constipation may succeed diarrhoea. On microscopic examination there is found much free fat, chiefly in the split form and there may be present undigested starch,

iodophile bacilli and unchanged muscle fibre. Blood examination does not show hypochromic anaemia, but did in one case show, temporarily, a hyperchromic anaemia. On test meal examination radiograms showed rapid passage of the food through the small intestine. As the large intestine can perform all the absorptive functions of the small intestine, except that of split fat products, it can be understood how in this disease, with accelerated transit of food, fatty acids and soaps remain evident in the faeces. If the hyperactive peristalsis be checked with opium the fat disappears from the stools, thus showing that there is no lack of lipase and therefore that this is not a pancreas diarrhoea. The condition here described is known in the literature as soap dyspepsia. In this particular case a differential diagnosis must be made from sprue, hill diarrhoea and coeliac disease. Account has to be taken also of the fat diarrhoeas of gastroenterostomy, after gastrocolic fistula, and of non-tropical sprue. The author discusses especially the first three of these and comes to the conclusion in this particular case that besides the ordinary causes of "soap diarrhoea" due to disease of the intestinal tract, there remained over a group of patients whose symptoms could only be referred to rapid passage of food through the small intestine, and that this was "part of a neurosis of the autonomic nervous system (tropical neurasthenia, leiodystonia)." A strong impression was created that the occurrence of the disease in a restricted district was in some cases of the nature of "psychic infection" developing as a result of suggestion in neurotic individuals. A number of cases remained over in which no very satisfactory explanation could be given. *W. F. Harvey.*

MILLER (D. K.) & BARKER (W. Halsey). **Clinical Course and Treatment of Sprue.**—*Arch. Intern. Med.* 1937. Sept. Vol. 60. No. 3. pp. 385–414. With 5 figs. [13 refs.]

This paper presents a complete study of sprue based upon 33 patients in hospital during the past four and a-half years. All but four had resided in tropical or sub-tropical countries; 11 in China, 9 in Porto Rico, 4 in Central and South America, and one each from Cuba, Turkey, Algeria, Japan and the Philippine Islands. Of these, 25 were females and 8 males.

On clinical grounds this series was divisible into three groups:—

A Group.—Patients with anaemia and diarrhoea.
B Group.—Patients with diarrhoea, but without anaemia.
C Group.—Patients without anaemia or diarrhoea.

(*A*) The oral lesions consisted of: (1) Atrophy of the lingual papillae; (2) Redness of the tongue and oral mucosa; and (3) Vesicular and ulcerated lesions of the tongue and mucous membrane.

Failure of the stomach to secrete free hydrochloric acid after injection of histamine was observed in one patient only. In four other patients free hydrochloric acid was absent until after the injection of histamine. In one only was the amount of free hydrochloric acid greater than 30.

Nine of the patients gave a history of having had anaemia before admission to hospital. The generally accepted pernicious anaemia changes were observed and the effect of anti-sprue therapy on the blood picture became very apparent.

(*B*) The lack of disturbance of haematopoiesis separated these patients from those just described. The gastro-intestinal symptoms did not differ from those of the previous group, except that nausea and vomiting had been less frequent and the attacks had not extended over so long a period. The oral symptoms were identical with those of the patients in Group (*A*). Two typical cases in this group illustrated well the amelioration of intestinal dysfunction which may be obtained by the parenteral injection of liver extract, although dietary therapy alone had been ineffective.

(*C*) Before entering into hospital all these patients had had repeated attacks of flatulence and diarrhoea over periods from one to twenty-five years. All except one had had soreness of the mouth ; eleven had had symptoms referable to the intestinal tract. Special attention was paid by these workers to the X-ray appearances of the digestive tract. A distortion of the calibre and of the mucosal pattern of the intestinal loops were the most significant changes in the small intestines in 29 cases of sprue.

All the patients showed these changes in various degrees. In general, the more severe the disease, the more pronounced the morphological alterations ; but it cannot be said at this stage that they are pathognomonic of sprue ; nevertheless a correlation appears to exist between the severity of the disease and the extent of the morphologic alterations. Furthermore the changes can be shown to regress after the use of anti-sprue therapy.

Treatment before, during, and after hospitalization was shown to be dependent to a great extent upon the dietary. That used in the clinic was essentially high in protein and low in fat and carbohydrate. Special emphasis was placed on the taking of large amounts of red meat.

The great majority of patients experienced complete symptomatic relief once adequate therapy had been instituted, and in addition they maintained themselves in relatively excellent health over long periods on a relatively simple therapeutic regimen. Emphasis is laid on the fact that no patient discontinued specific therapy without suffering a relapse. The maintenance of a diet for sprue in addition to liver extract therapy gives the patient more complete relief of gastro-intestinal symptoms than does liver extract given parenterally alone. The frequency of these injections must be worked out for each patient. It appears that the amount of liver extract necessary to prevent the recurrence of gastro-intestinal symptoms is far greater than that required to maintain normal blood values. *P. H. M.-B.*

BABONNEIX (L.), DUVOIR (M.) & POLLET (L.). Un cas de sprue. [**A Case of Sprue.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1936. Nov. 23. 52nd Year. 3rd Ser. No. 31. pp. 1515–1518.

The patient was a seaman, 23 years of age. He had been at Cayenne, French Guiana, where he had done his military service as a marine. In March 1935 he had an acute dysenteric attack with fever. When seen by the authors in June 1936 he stated that he suffered from early morning diarrhoea, with pasty, copious, yellowish-white stools which were acid and fatty. He showed aphthous stomatitis, which was clearing up. He had lost over 20 kgm. since the onset of his illness and weighed only 39 kgm. Examination of the stools revealed marked steatorrhoea, no signs of parasites (a duodenal sound was passed for Giardia). In March 1936 a blood examination gave 3,720,000 red

cells; in June only 2,560,000, Hb. 65 per cent., colour index 1·3. He was put on a diet of vegetables and raw fruit, no fat, and was given parathyroid injections and liver *per os*. The improvement was very marked. In two months his weight was 65 kgm., a gain of 66 per cent., the anaemia had disappeared, red cells numbered 5,300,000 per cmm., Hb 95 per cent., C.I. 0·9. He was again on ordinary diet, stools were normal in appearance, at most 2 or 3 daily, never in the early morning; no stomatitis.

The authors say that the case is interesting for two reasons; the rarity of adult sprue and the good results from treatment. [The first, of course, is a mistake; sprue is a disease of adult life and middle age and rare in the young.] *H. H. S.*

CASTELLANI (Aldo). **The Rhamnose Test.**—*Jl. Trop. Med. & Hyg.* 1937. Aug. 16. Vol. 40. No. 16. pp. 185–186. With 1 fig.

The rhamnose test is carried out thus: Four gm. of chemically pure rhamnose are given in about 4 oz. of water to a patient fasting. Hourly for six hours the urine is collected and tested for reducing substance (rhamnose) by the Fehling or Benedict reaction.

In normal persons the urine gives the reaction in 1–3 hours and continues to do so for five or six hours, in some cases longer. The rhamnose test is intended as a gauge of intestinal absorption of monosaccharide sugars. The author has made the test on 83 patients suffering from various diseases, among others malaria, kala azar, typhoid fever, undulant fever, ankylostomiasis, certain skin diseases and sprue. Absorption was normal in all but some of the sprue cases. Eight of these were studied; in two severe cases in an advanced stage the test remained persistently negative (during two months' observation); in a third severe case it was negative for a fortnight, then became positive; in one of medium gravity, negative for 11 days, then positive, and improvement thereafter was rapid; in the remaining four, three of them mild cases, the test was constantly positive. Thus, in sprue, its clinical value is small, though if negative (as it was in four of these eight cases) it is indicative of diminution in the absorptive functions of the intestine. It will gain in value if the test is made quantitative and not merely qualitative. *H. H. S.*

FAIRLEY (N. Hamilton) & MACKIE (F. P.). **The Clinical and Biochemical Syndrome in Lymphadenoma and Allied Diseases involving the Mesenteric Lymph Glands.**—*Brit. Med. Jl.* 1937. Feb. 20. pp. 375–380. With 2 charts.

The authors place on record an interesting series of four cases presenting many of the signs and symptoms which have been regarded as typical of sprue, *viz.* flatulence, doughy abdomen, hypertension, anaemia, cramp, tetany, sore tongue, dry skin and the passing of large, pale, fatty and frothy stools. Laboratory investigations revealed other resemblances such as a high percentage of faecal fat, a flat type of glucose tolerance curve and a low serum calcium. In one this last was very low, 5·7 mgm. per cent. One patient, a man of 60 years, had lived in Ceylon for a long period and showed an anaemia of the megalocytic type, and it was more than possible that he was actually

suffering from sprue, though perhaps not primarily. The common feature in all four patients was enlargement of abdominal lymph-glands, the character in two being that of a lymphoma, one lymphadenoma and one either this or lymphosarcoma.

[The authors in their discussion of these cases state that three of the four ended fatally, but in the detailed report death is mentioned in two only.] The point, however, is that in each there was some form of adenopathy of the mesenteric glands, resulting in lymphatic obstruction and malabsorption of food. The pathogeny is thus explained: Lymph stasis would result in defective absorption of fat and fat soluble vitamins A and D and steatorrhoea and malnutrition would follow. Failure of absorption of vitamin D might underlie the severe hypocalcaemia referred to above. Fatty acids present in excess in the stools, by uniting with Ca to form insoluble soaps, would further reduce the absorption of ingested calcium [see also this *Bulletin*, 1932, Vol. 29, p. 463; 1936, Vol. 33, p. 69]. [Incidentally, it is not usual to express colour index as a percentage.] *H. H. S.*

WOLTMAN (Henry W.) & HECK (Frank J.). **Funicular Degeneration of the Spinal Cord without Pernicious Anemia. Neurologic Aspects of Sprue, Nontropical Sprue and Idiopathic Steatorrhea.**—*Arch. Intern. Med.* 1937. Aug. Vol. 60. No. 2. pp. 272–300. With 2 figs. [72 refs.]

Subacute combined degeneration of the spinal cord involves a major problem that centres about the type of degeneration usually associated with pernicious anaemia.

It is asserted that more than sixty associated conditions, or causes, have been advanced for combined degeneration. Most usually the nature of the underlying pathological picture is neglected. The type of cord degeneration may not be entirely dissimilar. The typical picture of subacute combined degeneration, when seen in an unusual setting, always suggests that the condition is really pernicious anaemia in disguise. The funiculi of the spinal cord may be altered by many diseases and in many ways and the differential diagnosis cannot always be made upon clinical evidence alone.

Before the absolutely correct diagnosis of subacute combined degeneration of the cord can be made, typical and well developed clinical and pathological observations must be brought forward as evidence.

The authors have made a comprehensive survey of the available literature of the subject and it appears that a clinical picture somewhat akin to the classical subacute combined degeneration may be brought about by chronic alcoholism, gastric carcinoma, obstruction or fistulae of the intestinal tract, as well as pernicious anaemia; it may also possibly happen in pancreatitis, pellagra and haemolytic icterus. As a basis for the present paper, 77 cases have been studied in which there were signs of involvement of the posterior and lateral columns of the spinal cord and in which free hydrochloric acid was present in the gastric contents. It is necessary to emphasize that this latter finding eliminates pernicious anaemia altogether.

In these cases, symmetrical, but persisting, paraesthesiae of the hands and feet were noted, just as in pernicious anaemia. There were 8 cases in which these symptoms were present.

The question of nerve involvement in sprue is of especial interest to tropical workers. In a review of more than 200 articles on sprue it was found that only in 20 was any evidence of organic involvement of the nervous system mentioned.

Gastric analysis revealed the presence of free hydrochloric acid in 52 out of the 93 cases of sprue and allied conditions studied. Neurological examination was performed in only 29 of these. In 6 of these cases there had been continuous parasthesias of hands and feet; in 6 the tendon reflexes were diminished and in 10 vibratory sense was impaired, usually on both iliac crests or at the malleoli.

Macrocytosis was present in 8 cases. The neurological condition in one case (paralysis of the left peroneal nerve) was regarded as a complication, not directly related to sprue.

The important neurological findings which may be occasionally observed in sprue and idiopathic steatorrhoea, and which are dependent on organic involvement of the nervous system, usually express themselves as persistent acro-parasthesias and impairment of vibratory sensibility. In one case of sprue only the clinical findings indicated subacute combined degeneration of the spinal cord, *i.e.*, abdominal reflexes absent, Babinski, Chaddock, Rossolimo and Mendel-Bechterew reflexes strongly positive, definite incoordination of upper extremities, and a moderate degree of astereognosis. These clinical findings disappeared after intensive intramuscular administration of liver extract.

[The reviewer, in a clinical experience of 500 cases of sprue in the last 15 years has encountered two undoubted cases of subacute degeneration of the cord, and in both these the appearance of the typical clinical syndrome presaged a fatal termination.]

P. H. M.-B.

[Chaddock reflex is extension of the great toe on stimulation below the external malleolus; Rossolimo's is extension or abduction of the great toe when the plantar surface of that toe is stroked. Mendel's or Mendel-Bechterew's dorsal reflex of the foot: percussion of the dorsum of the foot normally causes extension of the second to fifth toes; in certain organic nervous conditions plantar flexion occurs. These are used to indicate lesions of the pyramidal tract.—*Ed.*]

BARKER (W. Halsey). **Congo Red in the Treatment of Pernicious Anemia and Sprue.**—*Amer. Jl. Med. Sci.* 1937. Sept. Vol. 194. No. 3. pp. 293–303. With 7 charts.

In 1934 MASSA and ZOLEZZI announced the successful treatment of pernicious anaemia by intravenous injections of Congo red, and in 1935 their observations were confirmed by MEROD and DOCK.

Congo red is a synthetic colloidal dye with a known chemical formula. It is employed in a 0·5 per cent. solution made up in 0·5 per cent. saline solution. This solution is warmed almost to boiling point, allowed to stand for 24 hours and then filtered. Injections of 20 cc. of this solution are given every 1–2 days for 5–6 days, followed by a rest period of several days.

RAYNER, in an attempt to substantiate the claims made for this treatment, selected proven cases of pernicious anaemia on remission as the result of liver extract therapy. Weekly injections of Congo red

(Grübler) solution were substituted for intramuscular liver extract injections. The results are illustrated by tables and graphs. It became evident that five of the six patients evinced a marked tendency to relapse, as shown by falling red count and haemoglobin as well as by rising mean corpuscular volume and colour index.

In four of the cases distinct symptoms of relapsing pernicious anaemia appeared, concomitant with characteristic blood changes. These symptoms disappeared and the blood levels returned to normal when intramuscular liver therapy was resumed. Two cases of sprue were also treated in a similar manner. In both, symptoms of the disease returned in an exacerbated form. The conclusion is reached that Congo red is totally ineffective in the treatment of pernicious anaemia or sprue. *P. H. M.-B.*

MISCELLANEOUS.

SOREL (F.). Les écoles de médecine de l'Afrique française. [**The Medical Schools in French West Africa.**]—*Bruxelles-Méd.* 1937. Aug. 22. Vol. 17. No. 43. pp. 1526–1535.

This paper gives an account of the medical schools at Dakar and Yaounde, French West Africa, in which are trained medical assistants, midwives and health visitors.

After French rule in West Africa became firmly established it was soon realized that in order to provide a medical and health service adequate to the needs of the population it would be necessary to train local personnel. Financial considerations precluded the possibility of providing a large European staff, and in any case it was felt that the trained native was the natural intermediary to convey new ideas to the mass of the people.

Useful lessons were learnt from the experience of the Medical School of Madagascar established in 1896. This school gives a four years' course which includes 22 months general medicine, 14 months general surgery, 2 months midwifery and 2 months pharmacy. More than 700 diplomas in medicine and 400 diplomas in midwifery have been granted by the school. The training is scientific, but the individual results have often been disappointing.

The Dakar School was founded in 1918. It was speedily realized that the instruction must be simple and practical and that it must be accompanied by moral training. The standard of education of the medical student is high. Selected candidates from secondary schools receive a higher education in general subjects and science, usually at the William Ponty School at Dakar, for a period of two years.

The medical course proper lasts for four years. Clinical teaching is given mainly in the wards. From eight to twelve beds are assigned to each student and they are required to make complete clinical records of all their cases. In the third year pharmacy is added, and in the fourth year they take midwifery and gynaecology and ante- and post-natal work. On completion of their training they are usually posted for duty to their native colony. After six or seven years' work in rural areas they return to Dakar for a refresher course.

There is ample clinical material for teaching as the native hospital at Dakar has 440 beds and there is also a maternity hospital of 60 beds and a polyclinic in the town with facilities for the treatment of tuberculosis, gynaecology, children's diseases, and general medical and surgical cases. There is now a specialized teaching staff.

A centre was established at Ayos in the Cameroons in 1932 for the training of health assistants (*aides de santé*). They receive a three years' course in anatomy and physiology, nursing, the rudiments of pathology and obstetrics, and personal and communal hygiene.

Through the medium of numerous stationary and mobile dispensaries the medical assistants are doing good work in the control of epidemic and endemic diseases, carrying out simple measures of hygiene, and compiling health records in rural districts. *W. H. Peacock.*

HUARD (P.). Le climat et la pathologie de l'Afrique Orientale italienne. [**Climate and Diseases of Italian East Africa.**]—*Ann. de Méd. et de Pharm. Colon.* 1937. Jan.–Feb.–Mar. Vol. 35. No. 1. pp. 157–180. With 3 figs. [60 refs.]

The author analyses a number of recent Italian papers concerning Eritrea and Italian Somaliland with a few references to Abyssinia ; a list of them foots the pages.

In the description of the climate of Eritrea it is interesting to note that while the Italian press regards it as the worst in the world and compares it with the infernal regions, GIORDANO, a medical officer of the Italian navy, writes that compared with many other tropical regions the climate is healthy, provided that the rules of good hygiene are observed.

The infections and diseases are discussed, with figures for various places. Helminthiasis is stated to affect 95 per cent. of the natives. The incidence of hookworm varies from 16 to 50 per cent. [whether producing symptoms or not is unstated]. While that of intestinal amoebiasis is given as 8–30 per cent., the liver is rarely affected. Vesical schistosomiasis has long been known in Italian East Africa ; recently the rectal form has been identified by SATTA in an autochthonous focus near Asmara ; *Planorbis boissyi* or a variety thereof was found in a neighbouring torrent. The opportunities of introduction into Italy are indicated. Malaria is common in Somaliland, much less so in Eritrea. Smallpox is a great scourge, especially in Abyssinia, as figures show. Other diseases discussed are : louseborne relapsing fever, typhus (common in the Abyssinian army, no case among Italian soldiers), cerebrospinal meningitis, dengue, tuberculosis, mycoses, leprosy, venereal diseases, scurvy, skin diseases, tropical ulcer, snake bite. *A. G. Bagshawe.*

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1936** [LEWTHWAITE (R.), Acting Director].—pp. vi + 157. 1937. Kuala Lumpur : Govt. Press. [$1 or 2*s*. 4*d*.]

During 1936 considerable progress was again made in the quality and quantity of routine services rendered to the Medical, Health, Police and several other Government Departments.

Malaria.—Experiments designed to test the efficacy and safety of atebrin and quinine in clinical prophylaxis were continued by Dr. J. W. FIELD. Clinical evidences of malaria under severe endemic conditions were almost eliminated by atebrin prophylaxis at an adult dosage of 0·2 gram on two successive days each week. " The risks appeared of low order, but safety was not entirely assured." Half-dosage at 0·2 gram once a week was also tested, and an intermediate dosage is now under test. A summary is given of Dr. J. C. NIVEN's therapeutic test of atebrin-musonate in comparison with quinine on a carefully chosen series of 555 cases of acute malaria. It is felt " that the use of atebrin-musonate should be limited to cases of acute malaria which cannot be satisfactorily treated orally." Injections of atebrin-musonate are relatively painless, while with injections of quinine there is a wider margin of safety. Treatment of some 50 cases of acute malaria by Dr. C. GUEST with " Malarene " led to the conclusion that the drug is not a satisfactory remedy under local conditions. Promising results

have followed the therapeutic testing of Tablets of Quinine, specially prepared by Mr. A. V. HITCH. His aim has been to produce a quinine tablet combining the cheapness of the sulphate with the ready solubility and compact form of the hydrochloride.

Typhus.—Tsutsugamushi disease is now considered identical with Rural Typhus by Drs. R. LEWTHWAITE and S. R. SAVOOR, who are now only using the former name.

From much experimental work on laboratory animals in attempts to prepare a prophylactic vaccine against Tsutsugamushi disease, the most hopeful results to date have been attained by attenuation of the virus by photodynamic action. Immunization of a horse with ordinary virus has been followed by a positive Weil-Felix (OXK 1/200–1/300), but so far prophylactic value of the serum has not been demonstrable. Transmission experiments with insect vectors have been continued and have indicated that transmission of Tsutsugamushi virus by the tick, *Dermacentor andersoni*, and flea, X. *cheopis*, and of urban typhus by the tick are unlikely to be of epidemiological importance. During these experiments an accidental infection with *Spirillum minus* was found to be associated in rabbits with a positive Weil-Felix (OXK) reaction. Experiments were also designed and made to see whether rats, rendered immune to the virus of urban typhus, if re-infected could transmit the virus to fleas and possibly thus maintain the virus in nature. Rat brain and spleen were found non-infective a month after infection, and no virus could be demonstrated in fleas fed on rats which had been re-infected after a 6 months' interval. Oral transmission, by a method simulating cannibalism, was successful in only 1 out of 9 experimental white rats, and further propagation of that infection failed, although four passages were made in the hope of thus exalting the virulence of the transmitted virus.

Bacteriological.—The various coliform organisms found associated with pyelitis are under investigation by Dr. R. GREEN. Screw-capped bottles for many culture media have been introduced with great success. A list is given of cultures available in stock. This may be of considerable service to bacteriologists in the East. A grant from the Palm Oil Producers' Association of Malaya has enabled an investigation to be started by Dr. J. T. PARANJOTHY on the efficacy of various "rat viruses."

Chemical (Mr. R. W. BLAIR).—Great advances are recorded in the chemical treatment of the chief water supplies. Attention is drawn to the danger to public health of water, probably of doubtful purity, added surreptitiously to milk. Apart from 129 out of 875 milk samples which failed to comply with the legal standards ($8\frac{1}{2}$ per cent. milk solids other than fat, and $3\frac{1}{4}$ per cent. of milk fat), there were another 24 samples which barely complied with the legal standards, and which, as a result of determination of the freezing point "were reported against as containing considerable added water." Dr. I. A. SIMPSON found that Malayan Palm Oil appeared richest in carotene pigment when obtained of low acidity from fully ripened fruit [see *Bull. of Hyg.*, 1937, Vol. 12, p. 294].

Entomological.—An investigation of filariasis has been started in the Sabak Bernam peninsula, and also a study of the transmission of *Microfilaria malayi* by Mr. E. P. HODGKIN, in collaboration with Dr. J. J. C. BUCKLEY, of the London School of Hygiene and Tropical Medicine. The newly-opened padi area has been found to be already infected. Of a number of possible carriers tested, the various species of

Mansonia were most readily infected. Since Professor GATER's discovery that two or possibly three different species have previously been identified as *A. umbrosus*, both forms have been found infected and would therefore appear to be carriers of malaria. *P. H. Martin.*

FRANZ (Willy). Was wissen wir ueber die Akklimatisations- und Siedlungsmöglichkeiten für die weisse Rasse in tropischen Ländern? [**Our Present Knowledge of the Possibilities of Acclimatization and Settlement of White Races in the Tropics.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1937. Apr., May & June. Vol. 41. Nos. 4, 5 & 6. pp. 359–365; 399–416; 446–459. [58 refs.]

This long paper gives a complete account of its subject and should be read by all with knowledge of German.

The author distinguishes between individual or personal acclimatization in which the white immigrant by habituation and a way of living suited to the climate acquires for a definite time, maybe the duration of his life, the capacity to preserve in that climate his mental and bodily activities, and race acclimatization, in which a white population of some size is settled under altered climatic conditions without mixture with indigenous blood through several generations, retains completely its bodily and mental health and activity, does not lose its fertility and preserves the distinctive qualities of its forbears: his definition would admit of a moderate renewal of blood from the original home.

He distinguishes again between coastal or lowland climate, continental (steppe and desert) climate, characteristic of the subtropics, and mountain climate and gives the characters of each. The hindrances to acclimatization are tropical diseases, chiefly malaria and hookworm, climate and the "milieu." In a climate such as that of Espirito Santo at a height of 800–1,000 metres and more, there are no climatic hindrances. As to the lowland climates the settlement of N. Queensland is most significant. Other hindrances are psychical or due to the presence of a coloured population.

Means of overcoming these hindrances are fully discussed and stress is laid on acclimatization in stages, *e.g.*, that of Espirito Santo, where the lowlands were not occupied till the settlers were acclimatized to the highlands, the occupation of N. Queensland by persons from other parts of Australia rather than direct from England. He states that the London Child Emigration Society, which maintains a school farm in Western Australia and brings out children from England, intends not to place them in the less favourable climates but to put the next generation there.

The section entitled Examples of colonization from recent history contains interesting matter of which some account must be given. The author says that since the time of Vasco de Gama and Columbus, *i.e.*, 500 years, Europe has sent hundreds of thousands of its inhabitants into all parts of the earth and especially into the tropic zone, and asks what has become of them. The Spaniards and Portuguese solved the problem of acclimatization by intermarriage with the natives, an unsatisfactory solution for purity of race was lost. A great number of examples of settlement in the tropics were wrecked by tropical disease. The examples he selects for consideration are of places where these diseases are scarce or absent and where whites (chiefly Germans) settled and kept their race purity.

Jamaica.—In 1835–39 in consequence of the emancipation of the slaves by Act of English Parliament, 1,500 German peasants were settled in Jamaica, 200 in Seaford Town. Seaford Town now has a population of 500, nearly all of German origin. There has been no admixture with blacks.

Venezuela.—At Tovar, 1,500–2,000 metres, in the coastal mountains 350 German peasants were settled in 1843 : many perished or wandered off. In 1870, 30 families were present. AHRENSBERG reported in 1920 that in 1916 there were 100 families with 850 souls ; all in good health. There had been no admixture of native blood since intermarriage was penalized by expulsion from the colony.

Rio de Janeiro.—There are three German colonies, 50–80 km. from the federal capital, in all 20,000–25,000 Germans, of whom 8,000 live in Rio. Nova Friburgo was first settled in 1819 by Swiss. Petropolis in 1845 by 2,000 Germans. In 1852 there were 2,845 in all, 564 born in Brazil. Both health and climate are good. The settlements are at 800 metres elevation.

Minas Geraes.—A plateau with an average elevation of 581 metres. There are 10,000 Germans in the province, mostly scattered Juiz de Fora was founded in 1857 by several hundred German families who came out to make roads. A second colony, Theophilo Ottoni, was settled by Germans in 1850. A German school has existed there for 60 years. The people are healthy and prosperous.

S. Paulo.—A tableland with peaks of less elevation than in Minas Geraes. Germans are found everywhere. Between 1827 and 1855, 2,654 Germans and 599 Swiss were settled : there are now more than 30,000.

Espirito Santo.—This colony has been described lately [see this *Bulletin*, 1937, Vol. 34, p. 496].

In the whole of tropical Brazil are 155,000 Germans, chiefly peasants or land workers. Almost all have prospered, their health is good and reproduction normal. Other successful settlements are described, with less detail, in the highlands of Mexico and in Peru.

That the author's standard of success is high is shown by the fact that he is unwilling to admit the Panama Canal as an example of successful acclimatization ; the human material was selected, it was young and vigorous and much attention was given to health measures. Similarly, Kisser (Malay Archipelago) is excluded because of possible interbreeding with the natives. Even the instance of N. Queensland which receives full discussion is criticized on various grounds though the author himself regards it as a good instance. Some of the criticisms (CARIUS) refer to the small proportion borne by the N. Queensland population to that of the whole of Australia, the shortness of the time duration, the picked populations with males preponderating, the thinness of settlement which restricts the spread of disease.

A. G. Bagshawe.

MANSON-BAHR (Philip). **Investigation of Cases of Obscure Fever.**—Reprinted from *Practitioner*. 1937. Aug. Vol. 139. pp. 115–130. With 13 charts.

This article will serve a very useful purpose in pointing out to the practitioner the pitfalls which beset the path of him who does not make a very complete examination in cases of fever of obscure nature. This is even more important for the tropical practitioner because in

warm climates the causes of fever are more numerous and, what is rare in temperate zones, may be combined in the same patient. Thus, in Great Britain if a patient is suffering from fever and haemoculture reveals one or other of the enterica group of organisms, the medical attendant may rest content and make his diagnosis. In the tropics, it would be far from safe to conclude that this was the sole cause, for in addition to the enteric, there might quite likely be both malaria and hookworm infection, all of which might be taking part in producing the febrile condition and all of which would need attention if recovery is to be complete. Illustrative cases of interest are given by the author, with relative charts, and if little that is actually new is brought forward, it is well from time to time to lay stress on the fact that "more mistakes are made from want of examination than want of knowledge." *H. H. S.*

DERRICK (E. H.). **"Q" Fever, a New Fever Entity: Clinical Features, Diagnosis and Laboratory Investigation.**—*Med. Jl. Australia.* 1937. Aug. 21. 24th Year. Vol. 2. No. 8. pp. 281–299. With 14 figs. [Summary appears also in *Bulletin of Hygiene.*]

A description is given of a new fever, supposed to be of rickettsial origin, that has been observed of recent years in Queensland. Most of the recognized cases have been in abattoir workers. The present paper contains a detailed account of nine bacteriologically proved cases occurring in men of 17 to 55 years of age. Five of the patients were meat workers and three dairy farmers. The incubation period is 15 days or less, the duration of illness 7–24 days, and the case mortality so far is nil. The onset is acute, and the temperature rises rapidly. Sometimes there is a rapid defervescence in 6–9 days; at others the fever lasts for 3 or 4 weeks and abates gradually. The pulse is slow in relation to the temperature. The outstanding symptom of the disease is severe headache, often persisting for some days. A rash is unusual; in this series it occurred in only one patient, developing on the fourteenth day of the disease and disappearing within two days. Two patients had conjunctival congestion. The spleen was never palpable. Albuminuria is nearly always present at the beginning of the illness, but clears up before long. Blood examination frequently shows a relative and absolute lymphocytosis. Convalescence is variable in length, some patients returning to work in 2–3 weeks after the end of the illness, others taking several weeks or even months to recover. The usual bacteriological examinations, including the Weil-Felix reaction, give entirely negative results.

The differentiation of the disease was rendered possible by the discovery that the subcutaneous or intraperitoneal injection of the patient's blood, or less often the urine, into guineapigs gave rise to a febrile reaction followed by an immunity lasting for at least six months. Human blood was found to be infective during the fever up to about the 13th day; the urine was less often infective, and the positive results that were obtained were with urine taken between the 12th and 53rd day of disease. The incubation period in the guineapig varies from 2–18 days, depending on the dose inoculated. The illness is characterized by a fever of 4–6 days' duration with an abrupt onset and decline. The case mortality is nil. Infection may be of the inapparent type. If the animal is killed during the febrile period, the

spleen is found to be enlarged. After recovery, the guineapig is resistant to re-infection. During the fever, and sometimes for a few days after it, the guineapig's blood is infective, but not the urine; after withdrawal of the blood, the virus passes mainly into the clot. The liver of guineapigs killed during their illness is highly infective, and remains so for a month or more at 4–5°C. The virus can be maintained by passage through guineapigs. One virus has now undergone 30 passages without loss of virulence. All nine strains of virus so far studied appear to be identical.

The mode of infection in the disease is still in doubt. In guineapigs the disease fails to spread by contact. Wild rats usually develop only an inapparent infection after inoculation, and have not yet been found infected under natural conditions. In differential diagnosis influenza, enteric fever, typhus fever, Weil's disease, and seven-day fever have to be considered. Unlike influenza respiratory symptoms are usually absent in Q fever. From enteric fever the disease is differentiated by its acute onset and the absence of diarrhoea, and later by the negative blood culture and agglutination reaction. The absence of a distinctive rash in the first week is strongly against a diagnosis of typhus fever, and the absence of a Weil-Felix reaction in the second week practically excludes it. Conjunctival congestion, and occasionally jaundice, may cause confusion with the leptospiroses, and these have to be excluded mainly by pathological tests. So far as animal inoculation is concerned it may be noted that the guineapig is much more susceptible to the Q virus than to the virus of rural typhus, and that the Q virus does not set up the scrotal reaction seen in murine typhus infections. Rabbits are insusceptible to the Q virus. *G. S. Wilson.*

Burnet (F. M.) & Freeman (Mavis). **Experimental Studies on the Virus of "Q" Fever.**—*Med. Jl. Australia.* 1937. Aug. 21. 24th Year. Vol. 2. No. 8. pp. 299–305. With 6 figs. (3 coloured on 1 plate). [Summary appears also in *Bulletin of Hygiene.*]

The "Q" virus may give rise to a febrile reaction in monkeys inoculated intracutaneously or subcutaneously. No local lesion in the skin occurs after intracutaneous inoculation as in tsutsugamushi fever. The virus may survive and possibly multiply to a slight extent on the chorio-allantoic membrane of the developing chick embryo.

Most of the work recorded in the present paper concerns the results of intraperitoneal inoculation in mice. After inoculation with a suspension of infected guineapig tissue a symptomless non-fatal disease is set up, characterized mainly by the post-mortem appearances in animals killed 7–10 days later. The liver is enlarged and has a pale opalescent look. The spleen is enlarged, often greatly so, and is tense and of a uniform deep red colour. Smears from the cut surface of the spleen, stained by Giemsa's, Mann's or Castaneda's method, show the presence in variable numbers of intracellularly situated bodies that appear to be typical rickettsiae. Rickettsial bodies may also be found in the liver. A series of experiments were undertaken to find out whether the virus giving rise to the disease in the mouse was identical with that causing the acute febrile reaction in guineapigs. Cross-immunity experiments seemed to show that this was so.

Moreover, a disease was set up in mice, by the direct inoculation of blood from a human patient, characterized by the presence of large numbers of typical rickettsiae in splenic films, thus leaving no doubt that the disease in man, guineapigs, and mice is caused by the same virus. The rickettsial bodies are present in such large numbers in the mouse's spleen that it is possible to prepare, by suitable centrifugation, a suspension for agglutination purposes. In this way it was found that the serum of convalescent patients contained agglutinins for the Q Rickettsia, but not for any of the *Proteus X* group of bacteria.

The organisms themselves look like tiny rods, 1·0μ in length and about 0·3μ in width. Their shape varies from well marked rods to coccoid bodies indistinguishable from those of psittacosis. With Giemsa's stain they are reddish-purple in colour; with Castaneda's stain some are pale blue, and others are pink. They appear to grow in the form of intracellular colonies, but in any smear a proportion will be found to be extracellular. Though constantly present in the mouse, they have never been found in the tissues of the guineapig. Filtration experiments show that the virus can pass through gradocol membranes with an average pore diameter of 0·7μ, though the concentration of virus in the filtrate is very low. White rats are susceptible but less so than mice.

The differentiation of Q fever from other rickettsial diseases is discussed. It is concluded that the Q virus is a new type of Rickettsia because (1) there are no antibodies to X19 or XK in man or rabbits; (2) the morphology of the intracellular microcolonies in the spleen and liver cells of the mouse is different from that of any known type of Rickettsia. [It is not quite clear why the authors regard this organism as belonging to the Rickettsia rather than to the filtrable virus group. The facts that in its filtrability it resembles the vaccinia virus, and in its cytoplasmic microcolonies the psittacosis virus, taken with the complete absence of even group agglutinins to any of the *Proteus X* group, and the failure hitherto to find an insect host suggest that, till further evidence is forthcoming, the rickettsial nature of the virus should be accepted with reserve.] *G. S. Wilson.*

MANSON-BAHR (Philip); BIGGAM (A. G.). **Sigmoidoscopy in Tropical Practice.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. April 19. Vol. 30. No. 6. pp. 549–558; 559–563. Discussion pp. 563–564.

At a meeting of the Royal Society of Tropical Medicine and Hygiene on February 18th, 1937, papers were read on sigmoidoscopy in tropical practice. The subject is of considerable practical importance in tropical medicine and in addition to an abstract of the papers, a short account of the discussion which followed is appended.

In his introductory remarks, Dr. Manson-Bahr dealt with the technique of sigmoidoscopy and emphasized its value in tropical practice. In the local examination of the anus and rectum the left lateral position proved the most comfortable, but in very short or particularly muscular patients, the knee-elbow position was preferable. The dorsal or lithotomy position was the one most usually adopted—especially in elderly and obese patients.

Before inserting the instrument an inspection of the perianal skin should be made and the orifices of fistulae searched for. A leucoplakic condition of the skin was not uncommonly found in chronic bacillary

dysentery and sprue. Digital examination of the anus and rectum should proceed insertion of the instrument otherwise thrombosed piles or small carcinomatous ulcers might be missed during the rapid extrusion of the instrument by the anal sphincter at the end of the examination.

The indications for sigmoidoscopy were summarized as follows:

(1) A history of rectal pain, tenesmus, chronic diarrhoea, or muco-purulent or blood-stained stools.

(2) Haemorrhage from the anus which is not attributed to piles.

(3) Constipation alternating with false diarrhoea.

(4) Chronic diarrhoea which does not yield to simple medical treatment.

(5) Blockage of the bowel due to some obscure obstruction.

In preparing patients for sigmoidoscopy ½ to ¾ oz. of castor oil was advocated not later than 2 p.m. on the day before the examination followed by lavage of the bowel with hot water next morning.

Tincture of opium (5–15 min.) or morphia (grain ¼) may be given beforehand to lessen discomfort and pain. Luminal (grains 1–2) often proved useful in nervous patients.

Pathological studies indicated that in 80 per cent. of amoebic infections the rectum was first involved. Sigmoidoscopy naturally provided an easy method of inspecting the earliest lesions. The site of the submucous burrowing of *E. histolytica* is indicated by small yellowish elevations or papules; these, on rupturing, produce amoebic ulcers which appear as small red depressions up to 5 mm. in diameter, usually having a haemorrhagic margin; petechial haemorrhages are generally found in the vicinity. Between individual ulcers the mucous membrane is singularly unaffected, and its folds are more lax and reticulated than in the normal subject; this is in marked contrast to the contracted, rigid and stenosed appearance commonly encountered in the chronic stage of bacillary dysentery. Occasionally individual amoebic ulcers up to 1 cm. in diameter may occur in the sphinteric region or on the columns of Morgagni simulating malignancy. Hyperplastic granulomata of amoebic origin have also occasionally been mistaken for carcinoma. Another rare acute lesion is an amoebic proctitis in which there is excoriation and general destruction of the mucosa resembling that seen in bacillary dysentery.

In chronic amoebic dysentery where *E. histolytica* cysts are present in the faeces, lesions are less easily detected, and consist of very minute depressions or pits which can only be distinguished by the use of a magnifying eyepiece. The mucosa in these cases appears superficially "pock marked" or as if "nibbled by microscopic mice," the pittings being produced by scars left by the healing of small ulcers. They are the only lesions usually visible in symptomless carriers or cyst-passers. Scraping of any suspected amoebic lesion for subsequent microscopic study should be made with a Volkmann's spoon. In acute cases, vegetative forms are readily found in such scrape preparations but in the chronic pittings amoebae are scanty or have disappeared.

Following combined emetine-bismuth-iodide and yatren treatment, healing is extraordinarily rapid, and within 12 days granulations fill up the small ulcers and epithelium covers the depressions; all that can be seen at the site of former ulcers are small pink spots which are redder than the normal mucous membrane.

In chronic bacillary dysentery sigmoidoscopy is a most important aid to diagnosis since isolation of dysentery bacilli is rarely possible and the agglutination test is by no means always helpful. Here the bowel wall is rigid and inelastic while the surface of the mucosa is granular and of a carmine or rosy-red colour. It is easily traumatized and there is usually surface-oozing on withdrawal of the instrument. Fibrotic scarring of the surface and pseudo-polypi are sometimes seen, and partial stenosis of the bowel may be encountered.

In sprue sigmoidoscopy shows the mucous membrane of the bowel to be ridged, folded and easily traumatized. It is very finely granular on the surface and cherry pink in colour. The intestinal mucus is sticky and adherent, whilst typical yellowish or white sprue faeces pour down the lumen of the bowel. In advanced cases when atrophy has taken place the mucosa is lax, pale yellow in colour and parchment-like.

In conclusion the author recorded that during the past 16 years out of 3,068 sigmoidoscopies made by the Staff at the Hospital for Tropical Diseases, stenosis or stricture of the rectum had been found in only 24 cases. Seven were attributable to chronic bacillary dysentery, five to chronic amoebic dysentery, two to ulcerative colitis, and two to lymphogranuloma inguinale. The remainder were due to other causes such as carcinoma (5), syphilis (1), gonorrhoeal proctitis (1) and polyposis (1).

Lt.-Col. A. G. Biggam said the best preparation was a low residue diet on the day preceding the examination, and an ordinary soap and water enema followed by an alkaline wash-out next morning. Preliminary purgation should always be avoided. The right lateral position was the most comfortable for the patient, and during the insertion of the instrument gentle inflation to open up the lumen of the bowel was necessary. The healthy mucosa appears pink and glistening, resembling the inner side of the cheek.

In bacillary dysentery, where the patient had not been seen until the fifth day of onset, isolation of a specific organism might not be impossible. Here instrumental examination was of great importance. In very acute cases the gut wall was oedematous, rigid and often difficult to dilate, the necessary air pressure causing considerable pain. The mucosa was cherry red in colour, bled readily on slight trauma and the lumen of the gut generally contained mucus and blood. Ulceration, if present, was superficial and surrounded by inflamed mucosa—a finding which was in marked contrast to amoebic ulceration. In fulminating Shiga infections, where coagulative necrosis had occurred, the mucosa was greyish-green in colour. In mild cases of bacillary dysentery the degree of inflammation was much less and was often limited to irregular patches mainly disposed transversely in the direction of the folds of mucous membrane. Ulceration was infrequent and blood and mucus were scanty.

Subtertian malaria infection of the bowel through capillary obstruction sometimes produces acute dysenteric symptoms with blood and mucus in the stools indistinguishable from bacillary dysentery. In the milder cases the mucous membrane merely showed a diffuse or patchy hyperaemia, but in the more severe a generalised hyperaemia with scattered haemorrhages was seen. Occasionally superficial necrosis was evident which might be patchy or generalised in distribution. Recognition was difficult by sigmoidoscopy alone

and examination of blood films was generally necessary before a diagnosis could be made.

In amoebic ulceration the characteristic appearances were the discrete nature of the ulcers and the healthy intervening mucous membrane. Typical amoebic ulcers may sometimes be missed unless mucus adherent to the ulcer base be washed away. In severe cases which simulate bacillary dysentery clinically, extensive destruction of the mucosa ensued, only small islands of healthy tissue surviving between large ulcerated areas. Valuable information in regard to the effects of specific drug treatment in the healing of amoebic lesions can be obtained by sigmoidoscopy. On recovery the healing process was complete and nothing remained to indicate the previous site of ulcers, even when the area affected had been very extensive.

In schistosomiasis, caused by infestation with *S. mansoni*, the earliest recognizable change was a patchy hyperaemia of the mucosa. Here and there more intensely hyperaemic areas not elevated above the surface could be discerned. Later these may become elevated and finally polypoid masses formed. Degeneration results in ulceration of these papillomata. Following tartar emetic therapy the early lesions disappeared, but where they had progressed to the polypoid stage resolution did not occur. In the latter type of lesion dysenteric symptoms might persist for years ; local treatment was then essential and many polypi could be removed through the sigmoidoscope by electric cautery or diathermy.

In the discussion which followed Dr. C. C. CHESTERMAN said he was particularly interested to hear Colonel Biggam describe the papillomata associated with infestations with *S. haematobium* as flat and non-pedunculated. In the new species of schistosome in the Congo (*S. intercalatum*), which also deposited terminal-spined ova in the bowel, no such lesions had been noted by either Dr. FISHER or himself.

Dr. N. HAMILTON FAIRLEY pointed out that preparation for sigmoidoscopy involving the use of aperients or cleansing enemata often altered the appearances of the mucosa and lead to congestion and hyperaemia. The surest index to inflammation was the presence of bleeding when the mucosa was swabbed. Amoebic ulcers, as seen by the sigmoidoscope, were easily identified, but the recognition of amoebic granulomata and diffuse amoebic proctitis presented greater difficulty. In all these types of lesions scrapings should be made and examined microscopically, as vegetative *E. histolytica* were then readily demonstrated. Sigmoidoscopy was of value in both tropical and non-tropical causes of blood and mucus in the stools, but in his experience instrumental examination rarely revealed findings of tropical interest unless cellular exudate was present in the stools on microscopical examination.

Dr. GOLDBERGER insisted that proctosigmoidoscopy should be practised by every physician investigating bowel trouble. He then described his own special instrument which, by means of a telescope, gave a magnification of ten diameters. It could be passed 35 cm. up the bowel and was of special value in revealing strictures.

Dr. Manson-Bahr in reply said that definite puckering did sometimes follow the healing of amoebic ulcers. This was the only point on which he was at variance with Colonel Biggam.

N. Hamilton Fairley.

WEINER (J. S.). **Report on Heat Stroke, Heat Collapse, etc.**—*Central Mining—Rand Mines Group. Health Dept. Rep. Year 1936 together with a Review of the Work of the Department since 1914.* Annexure 2. pp. 74–113. With 29 figs. [20 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This interesting report summarizes the results of investigations of the effects of high temperatures on Bantu workers recruited for the Rand Gold Mines. The subjects were exposed in a heat chamber to the severe conditions of 96°F. dry bulb and 95°F. wet bulb, and their reactions studied both when resting and when working.

In 70 subjects the physiological adjustment of the heart and circulatory system was studied. Such adjustment entails the maintenance of a higher pulse rate and pulse pressure. In subjects working in the hot chamber the increases in pulse rate and pulse pressure over the values determined when the subjects rested in a cool environment corresponded to the sum of the increases found (*a*) when working in a cool room, and (*b*) when resting in the hot chamber. In natives who had to be withdrawn from the chamber after having reached the limit of their endurance the pulse rate was markedly accelerated, while in heat collapse the pulse is weakened and slow.

The reactions accompanying experimentally induced heat collapse were studied in a number of subjects. Collapse is attended by a slowing of the heart-rate from 160 beats per minute to 90–60, a fall in the systolic blood pressure and a much diminished pulse pressure. There is no abnormally high body temperature, nor is there increased sweat production or increased rate of respiration. The use of a test of circulatory efficiency (the Schneider test) did not make it possible to predict the liability of a subject to collapse, and when collapse did occur the circulatory efficiency as indicated by the test was not greatly diminished. Recovery takes place quickly when a collapsed subject is allowed to lie down in a cool environment.

Whether the subjects rested or worked, one hour's exposure in the hot chamber resulted in an acidosis as indicated by a lowering of the alkali reserve, hyperpnoea, a decreased *p*H of the urine, an increase in urinary ammonia, as well as a decrease in the base bound as bicarbonate and an increase in titratable acid in the urine. With prolonged exposure, an alkalosis develops secondarily ; this may be looked upon as a protective process, since heat-stroke is accompanied by acidosis. Exposure to heat also caused dilution of the blood, as shown by the haemoglobin concentration. The percentage of blood sugar fell initially, and later tended to rise.

In four cases of heat stroke the plasma alkali reserve was observed to be comparable with that found in severe diabetic acidosis. The urinary *p*H in these cases was on the acid side, and all the subjects exhibited hyperpnoea. Treatment for heat stroke should be directed towards reducing the body temperature by cooling (preferably by cool air), and the acidosis should be treated by the intravenous injection of bicarbonate solution. In two serious cases of heat stroke the patients were each given about 360 cc. of 2½ per cent. bicarbonate solution and both patients recovered.

Bearing on the subject of heat cramps, the chloride and water loss in the sweat of the subjects working and resting in the heat chamber, and the resulting concentrations of salt in the blood and urine, are reported. The chloride concentration in the sweat varied much

in different subjects, but in the majority the sweat chloride was below plasma level. There was no restriction of urinary output of chloride. From these observations, and from others on two subjects working underground, it seems likely that the total salt loss during a mining shift is compensated for by the salt contained in the ordinary mine diet, and this probably explains the absence of heat cramps in the humid mines of the Witwatersrand.

Heat tolerance was assessed by means of the heat chamber test devised by DREOSTI [*Bulletin of Hygiene*, 1936, Vol. 11, p. 747]. The heat tolerance depends on the magnitude of the rise of mouth temperature when the subject works at a set task for one hour in an atmosphere at 96°F. dry bulb and 95°F. wet bulb. Mr. Weiner has studied the relation between heat tolerance, assessed in this way, and various bodily characteristics. No correlation coefficients are given, but from the tables there appears to be no clear relationship with the initial mouth temperature, with the vital capacity, or with the sitting or standing height. The figures suggest that heat tolerance may be associated with age, pulse rate and systolic blood pressure, but in no case does the relationship appear to be very close. *T. Bedford.*

STOTT (H.). **Heat Exhaustion and Dehydration in the Arabian Desert.**—*Indian Med. Gaz.* 1936. Dec. Vol. 71. No. 12. pp. 712–714.

This striking article records the sufferings of the passengers and crew of the aeroplane *Horsa* which made a forced landing in the Arabian Desert in August 1936.

The temperature in the shade of the wings where the passengers lay, was 125° or 130°F. from soon after sunrise to sunset. The air humidity was extremely low. There was a continuous but hot and dry breeze.

The clinical symptoms produced were those of heat exhaustion and dehydration. Faintness and giddiness were first in evidence, followed by signs of severe cardiac collapse—cold skin, weak pulse, and cyanosis. Owing to rapid evaporation, the skin did not become damp.

The clinical results of dehydration resembled generally those of cholera—a bone-dry skin, sunken dark-rimmed eyes, hollow cheeks, and greatly diminished secretion of urine. The mental drowsiness which all felt, the dyspnoea which affected many, and the bouts of Cheyne-Stokes respiration occurring in some, were probably caused by toxic metabolic products retained through the suppression of urine.

The account is written in a most graphic style.

W. P. MacArthur.

VASSALLO (S. M.). **Duodenal Ulcer in Zanzibar.**—*East African Med. Jl.* 1937. June. Vol. 14. No. 3. pp. 83–88.

The author finds that duodenal ulcer and pyloric stenosis are not rare in non-Europeans in Zanzibar. He thinks that hookworm may have a share in the causation. Treatment is surgical. Of 1,837 major operations performed by the author in Zanzibar, duodenal ulcer (or its manifestations) was found in 175 instances. The subjects were Indians, Arabs and Swahilis, the last term including several "mainlanders, particularly Mwanyamwezi." In only one of three Goans was the diagnosis confirmed by operation. Only 6 of the 175 were women,

who come to hospital with some reluctance and with still more to the operation table.

The author thinks that diet has some relation to the disease. In persons affected with hookworm the mimicry of duodenal ulcer is complete; they show tenderness over the pylorus, hunger pain and periods of intermission. He surmises that following a persistent hookworm infestation, changes may develop in the pylorus, passing on to ulceration. If the pains do not pass after treatment by Ol. chenopodii a barium meal is given and if ulcer is revealed operation is advised. No less than 35 of the 175 had pyloric stenosis, and 10 of these were apparently not older than 30 years. The classical syndrome of duodental ulcer is rare in Zanzibar, the ulcers are large with many adhesions, there is constant pain and often wasting owing to lack of treatment. Gastric ulcer has not been seen in non-Europeans.

Dietetic treatment owing to want of their co-operation is inapplicable to native races; treatment is therefore purely surgical. Formerly the author did posterior no-loop gastro-jejunostomy with excellent immediate results (4 deaths in the series of 175 cases). Some of the late results being less good, he now does a partial gastrectomy, removing the "ulcerable" area.

The editor has collected notes on peptic ulcer from other parts of East Africa. At Kampala there were 30 cases in a total of 7,019 operations, at Nairobi 22 cases of peptic ulcer in five years, half of which were duodenal; at Dar-es-Salaam, Mombasa and Nyasaland the condition was still rarer. *A. G. Bagshawe.*

KOUWENAAR (W.). Enterogene beri-beri. [**Enterogenic Beriberi.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1937. Sept. 7. Vol. 77. No. 36. pp. 2135–2142.

In this clinical lecture the case of a woman with certain symptoms is made the text for a discussion of enterogenic beriberi. The patient was a European, 47 years of age, who complained of difficulty of walking, with a sense of weight and weakness in the limbs. Her knees in walking had to be raised to prevent the feet from scraping the ground. Heart symptoms and loss of appetite were also complained of. She had never been strong, had had amoebic dysentery and cystitis, and was in receipt of a protein-poor diet for stubborn skin disease. Clinical examination showed diarrhoea, polyneuritis, oedema, some heart symptoms and hypoaesthesia of the feet, but the tendon reflexes were still present. The diagnosis made was enterogenic beriberi. Although meat, fish, eggs, cheese, peas and beans were excluded from her diet, that diet could not be said to be deficient in vitamin B_1. It included salads, potatoes, fruit, milk, etc.

The subject is taken up of relative conditional vitamin B_1 deficiency due to abnormal conditions in the gastrointestinal canal and defective absorption, even although there is no deficiency of vitamin B_1 in the food: reference is made to the curative action of this vitamin in quite a number of diseases in which polyneuritis is a prominent symptom. A tendency exists to describe these diseases as a form of beriberi. It is probable, however, that they are not just instances of simple B_1 avitaminosis and further research into the question is desirable.

The treatment recommended for the patient was administration of sufficient vitamin B_1, parenterally, because of the gastro-intestinal

disturbance. Then the enterocolitis had to be treated and the diet suitably altered. If a more liberal diet was barred by the presence of the skin disease, then the deficiency in vitamin would have to be made good in the form of tablets. Evidently this treatment was carried out and the ship's doctor reported such great improvement in the paralysis of the limbs and the diarrhoea, that the patient arrived in Holland from the Dutch East Indies practically cured. *W. F. Harvey.*

ELLINGER (P.), HASSAN (A.) & TAHA (M. M.). **Pellagra in Egypt.**—*Lancet.* 1937. Sept. 25. pp. 755–758. [16 refs.] [Summary appears also in *Bulletin of Hygiene.*]

" This paper contains a preliminary report of the results of recent investigations on pellagra in Egypt. These covered the relative frequency, the seasonal incidence, the distribution between sexes, ages, and trades, the dietary history and other contributory causes as well as the clinical symptoms of the disease, including porphyrin excretion."

The conditions in Upper and Lower Egypt differ considerably. In Lower Egypt in a random sample of population totalling 204 persons, 14 of 35 boys (40 per cent.), 5 of 10 girls (50 per cent.), 46 of 127 male adults (36 per cent.) and 5 of 32 adult females (16 per cent.), showed signs of pellagra, with no definite relationship with occupation. [With this high incidence, 34 per cent., it is rather surprising to learn that " There are no official statistics of pellagra in Egypt."] " Three-quarters of the pellagrins and one-third of the non-pellagrins were subsisting on pure maize bread." A hot meal of vegetables cooked in oil or fat is taken in the evening.

It is worthy of note that among clinical symptoms, skin lesions were noted on pressure points but never in the neighbourhood of the genitals. Angular stomatitis, however, occurred in 68 per cent. Only three cases showed signs of subacute combined sclerosis and none mental symptoms. Anaemia as estimated by inspection of conjunctiva and buccal mucous membrane was present in 60 per cent. pellagrins and 43 per cent. non-pellagrins, doubtless due to heavy helminthic infections.

In Upper Egypt pellagra is rare and little definite information was collected, but lesions of the nervous system were much more common than in the Delta. The diet is different from that in Lower Egypt in that it is more varied and the bread is made of maize only from December to March, at other times from barley or millet. Parasitic infections are much less common. The pellagra season begins in November with a maximal incidence in January, February and March.

In consequence of the interest reawakened by the observations of BECKH, Ellinger & SPIES upon porphyrinuria in pellagra (*Quarterly Jl. Med.*, 1937, Vol. 23, p. 305) porphyrin excretion was estimated in Egypt. In almost all the pellagrins examined there was an increased excretion " but in a high proportion of the non-pellagrous villagers there was also abnormal porphyrinuria." This is attributed to the parasitic infection.

" Pellagra in Egypt appeared to result from two concomitant but independent factors: malabsorption due to parasitic infection of the intestines and malnutrition due to a diet insufficient in the vitamin-B_2 complex caused an increased formation, circulation, and excretion of porphyrins—*i.e.*, a condition of latent pellagra. In such people the onset

of active pellagra is precipitated by very hard physical work, especially in the open air, by intensive exposure to sunlight, or by febrile infectious diseases."

[It should be realized that such a statement is at the present time theoretical and it is going too far to state as is done elsewhere in this paper—" This sensitiveness (of the skin) to light is caused by porphyrins circulating in increased concentration in the blood " ; it has not actually been proved.] *H. S. Stannus.*

CLARK (A.). **Notes on Pellagra in Egypt, 1936–37.**—*Jl. Trop. Med. & Hyg.* 1937. Oct. 1. Vol. 40. No. 19. pp. 221–226. With 2 charts.

A description of the conditions of life of the fellahin in Lower Egypt followed by a restatement of the arguments in favour of looking upon pellagra as an upset in metabolism caused by hydrocyanic acid in foodstuffs which robs the tissues of their sulphur content, with the overproduction of thiocyanates. Dr. Clark believes that maize and the large millet, both of which he includes under the name " durra," produce prussic acid and in such amounts as to be the cause of this disturbance in metabolism. *H. S. Stannus.*

TROWELL (H. C.). **Pellagra in African Children.**—*Arch. Dis. Childhood.* 1937. Aug. Vol. 12. No. 70. pp. 193–212. With 3 figs. [40 refs.]

During the past few years a number of papers have appeared describing conditions among African children under various designations of uncertain aetiology. In summarizing these papers individually and later collectively the reviewer suggested that these conditions were all of a pellagrous nature. In the present article Dr. Trowell gives a most excellent account of the disease based on observations made upon cases observed at Nairobi Hospital, Kenya, during 1934–5. The condition is dealt with from all points of view and his paper forms the best account of the affection yet published, deserving of being read by all those practising in tropical Africa.

Dr. Trowell now pronounces the condition to be definitely pellagra, though it is interesting to note he has not observed this disease in the adult population. No attempt will be made to summarize this paper—it must be read in full.

Some observers have attempted to find some affinity between this African disease and pink disease of European children. It is interesting to observe that the author says the differences between pink disease and infant pellagra are more obvious than the similarities.

H. S. Stannus.

i. MOORE (D. G. Fitzgerald). **Retrobulbar Neuritis cum Avitaminosis followed by a Post Partial Optic Atrophy—now shown to be of a Pellagrinous Nature. Its Serious Incidence and its Need for General Investigation.**—*West African Med. Jl.* 1937. June. Vol. 9. No. 2. pp. 35–40. [17 refs.]

ii. DODDS (G. E.). **Report upon a Case of Pellagroid Avitaminosis.**—*Ibid.* p. 40. With 7 figs.

i. Some time ago Dr. Fitzgerald Moore called attention to a form of retrobulbar neuritis in natives of West Africa associated with a diet

of cassava. He now points out how widely spread is the affection and that it presents a problem of considerable economic importance. Sixty per cent. of some 3,000 visual defectives seen in eighteen months were of this nature. The signs are those of a true optic neuritis followed, if untreated, by atrophy ; in many who recover their vision there is some persistent residual defect. Treatment by sulphur, icthyol, thiosulphate, etc., is ineffective ; on the other hand response to marmite is most satisfactory.

Dr. Moore now considers the condition to be part of " a pellagrinous syndrome " and refers to a number of papers on similar conditions without reference to the articles in this *Bulletin* in which all these conditions were brought together and discussed.

ii. Report upon a typical case. *H. S. Stannus.*

TSCHILOW (Konstantin). Kombination von Hungerödem mit Pellagra. [**Hunger-Oedema in Association with Pellagra.**]—*Wien. Klin. Woch.* 1937. Oct. 15. Vol. 50. No. 41. pp. 1422–1423. With 2 figs.

A report on a case of hunger oedema in association with pellagra, occurring in the person of a 52-year-old male in Sofia. That oedema occurs in certain of the avitaminoses, such as beriberi and scurvy, for example, is well known, but the author says he has failed to find in the literature any case analogous to his own. Treatment by means of lactovitellosin and laktosin was successful. [Cases of pellagra with oedema have received notice in this *Bulletin* from time to time in the past two years, see 1936, Vol. 33, p. 821.] *H. S. Stannus.*

PETRI (Svend), WANSCHER (Oscar), STUBBE TEGLBJAERG (Else) & STUBBE TEGLBJAERG (H. P.). Om behandling af pellagra med ventrikelpraeparater og om lidelsens gastrogene aetiologi samt beslaegtethed bl. a. med. polyneuritis. [**Cases of Pellagra treated with " Ventriculin."**]—*Hospitalstidende.* 1937. July 13. Vol. 80. No. 28. pp. 817–840.

This report is of team work carried out partly at the Pathological Institute of the Municipal Hospital in Copenhagen, partly at the mental hospital, Filadelfia, which provided the six cases of pellagra studied. They were all cases of depressive psychoses in women who, in spite of a normal dietary, had developed characteristic secondary pellagra. The authors have rung therapeutic changes in their treatment of pellagra on neutralized human gastric juice, raw, pressed out, pig's gastric juice, and ventriculin, which is a Danish preparation of pig's stomach, dried, de-fatted, and pulverized. Their therapeutic successes were scored almost exclusively with the last-named, which acted like a charm in all six cases, banishing every sign of pellagra within two months or less of the beginning of treatment, but having no uniformly beneficial effect on the mental disease. From a survey of the literature and of their own experiences the authors conclude that pellagra is not always amenable to dietetic treatment alone, however complete and vitamin-rich the food may be. Again, pellagra may disappear without any change in the composition of the food or even on a so-called pellagra-promoting dietary. It is, therefore, difficult to

accept the theory that pellagra is due to a deficiency of vitamin B_1. The authors' clinical experiences and observations on gastrectomized dogs has led them to believe that the determining factor in the genesis of pellagra is some change in the functions of the stomach. They also develop the theory that a whole group of diseases such as pernicious anaemia, pellagra and polyneuritis have so many cardinal features in common that their aetiology may conceivably be traced to one and the same factor dependent on the stomach's functions. They admit, however, the lack at present of a biological method for the demonstration of this factor which they hold responsible for what they describe as a gastrogenic, neuro-cutaneous, symptom-complex.

C. Lillingston.

BLACKIE (W. K.). **Onyalai: a Review.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. July 31. Vol. 31. No. 2. pp. 207–226. [22 refs.]

In this interesting paper, which is more than a review, Dr. Blackie comes to the tentative conclusion that onyalai is an acute form of essential thrombocytopenia due to defective maturation of the megakaryocytes of the marrow and that a contributory cause in the production of the haemorrhagic bullae is an associated modification of the capillary endothelium.

The term onyalai was introduced by WELLMAN as that of a dangerous haemorrhagic disease of the highlands of West Central Africa, characterized by the formation of blood-filled bullae in the mucous membrane of the mouth and elsewhere, from which free and often fatal haemorrhage occurs. The term is unknown in Rhodesia, where the author's study was made; here the disease is called "chilopa" or "akembe" in Northern and "mhuka" and "manunga" in Southern Rhodesia. The diseases described by MENSE as "kafindo" and "edjuo" are probably different from onyalai.

Onyalai occurs in Angola and Portuguese West Africa, on the Lualaba river and near Mount Kenya as well as in the Rhodesias and is not met with outside Africa. The cause is unknown; there is no evidence of infection. Whereas in Rhodesia bleeding from the mouth and nose is the chief feature, in Portuguese West Africa it is haematuria. The clinical characters are described. A feature of the graver type of disease is the occurrence of physical signs of broncho-pneumonia, probably due to the presence of small haemorrhagic areas (H. H. SCOTT). A fatal case of cerebral haemorrhage with a haematoma over the temporal region led to the supposition of a murderous assault, negatived, however, by the finding of the characteristic bullae. The most effective treatment is that introduced in 1926 by MORRIS. It consists in the intramuscular injection of 18 cc. of donor's blood with 2 cc. of 10 per cent. sodium citrate; most patients require two injections, some as many as five or six. Blood transfusion is seldom necessary. Autohaemotherapy has not proved of value. An account based on two cases is given of the post-mortem findings.

Laboratory Findings.—The author gives a study, with tables, of seven cases, one fatal, admitted to the Salisbury Native Hospital in 1935. The reduction of red cells is rapid, it is ascribed to loss of blood from mucous surfaces and haemorrhagic infiltration of tissues and organs. The characteristic feature of the blood film is the anisocytosis. The anaemia is of the normochromic type met with in any acute haemorrhage. The reticulocyte count is low in the initial stages.

There is a remarkable reduction of circulating platelets at the onset; whereas in the normal subject the numbers range between 250,000 and 500,000 per cmm., in six cases of onyalai it lay between 20,000 and "less than 1,000." With this was associated a marked prolongation of the bleeding time: 2–5 minutes in healthy natives, it varied in the six cases investigated between 14 minutes and 2 hours 40 minutes. The coagulation time was within normal limits. The capillary resistance test (Hess) was positive in the five cases tested; the haemorrhagic spots can be seen in the dark-skinned native if the skin of the cubital fossa and wrist is cleared by means of clove oil. As regards the white cells, there is leucopenia with reduction of neutrophils and relative increase of mononuclears. For one case are given the haematological findings over a period of 25 days. Here on December 2nd the platelets numbered 1,750 per cmm., on December 3rd became 106,500 and on December 6th, 229,000. The rise preceded the cessation of haemorrhage. The maximal response in the reticulocyte percentage does not occur until 3–6 days after cessation of haemorrhage. A table gives observations on the biochemistry of the blood. The Wassermann was negative in four cases tested. The results of urine examination are tabulated; red cells were seen in all but one of the seven. Blood and faeces were examined for parasites, present in one instance in the faeces (*T. saginata*).

The nature of onyalai is discussed. There are found: (1) A marked thrombocytopenia; (2) a prolongation of the bleeding time; (3) a normal coagulation time; (4) imperfect clot retraction; (5) a positive capillary resistance test.

These findings place onyalai among the purpuras showing thrombocytopenia. There is no evidence of defect of marrow or spleen such as is associated with symptomatic thrombocytopenia and the conclusion reached is that onyalai is an acute form of essential thrombocytopenia. It is suggested that this deficiency is due to defective maturation of the megakaryocytes. An intra-muscular injection of whole blood replaces the factor required for maturation, platelets are budded off and their numbers rise abruptly. *A. G. Bagshawe.*

[It is hoped that Dr. Blackie will continue his researches on this puzzling condition. The above constitutes a big advance in accounting for its pathogeny, but does not explain the peculiarly limited localization to Rhodesia (and possibly Angola and the Congo). There must be some other basic element in the aetiology yet to be discovered. —*Ed.*]

SARNELLI (Tommaso). Considerazioni cliniche e anatomopatologiche su dei casi di leucoderma osservati in Arabia. [**Two Cases of Leucoderma observed in Arabia.**]—*Giorn. Ital. di Clin. Trop.* 1937. Aug. 31. Vol. 1. N.S. No. 8. pp. 234, 237–9, 241–3. With 7 figs.

Both the patients whose conditions are described were seen in Sànaa, in the uplands of Yemen. The picture was in each case typical clinically, as shown by photographs reproduced. The article is illustrated also by line drawings showing the histology of the normal skin, a part demonstrating a stage intermediate between this and the achromic stage, and a third depicting an achromic area under higher magnification. *H. H. S.*

GOODMAN (Herman). **An Insecticide (Flit) as a Cause of Dermatitis. Report of a Case of Eighteen Months' Duration in which the Husband was the Carrier.**—*Arch. Dermat. & Syph.* 1937. Sept. Vol. 36. No. 3. pp. 611–612.

" Flit " is an insecticide much in vogue in the tropics (and probably elsewhere) and is used also as a spray for keeping away mosquitoes. The following case is consequently of interest to practitioners in warm climates. A woman of 37 years consulted the author for a widespread cutaneous eruption affecting almost the entire body. In spite of many forms of treatment suggested by medical men and laymen, some of which seemed to give a little temporary relief at first, the lesions had persisted for 18 months. The cause was traced to Flit which had been freely used once a week or oftener for spraying the house, furniture, and in particular the beds. This woman was proved to be unduly susceptible, in fact allergic to it, other members of the family not being affected in the same way. The bedding retained sufficient to lead to recrudescence after the use of " Flit " was stopped, and finally, bed linen, blankets, pillows, etc., all had to be sent to the cleaners, and carpets removed, before the trouble ceased.

H. H. S.

SIMSON (F. W.). & STRACHAN (A. Sutherland). **Rhinosporidiosis in Man, with a Report of Five Cases occurring in the Union of South Africa.**—*South African Jl. Med. Sci.* 1937. July. Vol. 2. No. 3. pp. 82–88. With 3 figs. [34 refs.]

Rhinosporidiosis has been reported in India, Ceylon, the Argentine, the United States and the Philippines. The authors here record briefly notes of five human cases in South Africa, two Europeans and three natives, in whom the conjunctiva was affected [see also MANDLIK, this *Bulletin*, 1937, Vol. 34, p. 813]. *H. H. S.*

ELLIS (M.). **A Case of Porocephalosis.**—*West African Med. Jl.* 1937. June. Vol. 9. No. 2. p. 41.

Porocephalosis is a rare condition and according to a well-known text-book the diagnosis is never made during life. MANUWA recorded a case in which the parasites were found at autopsy on a man who had died with acute abdominal symptoms [see this *Bulletin*, 1936, Vol. 33, p. 475]. Dr. Ellis here records the case of a native, aged 28 years, operated upon for left inguinal hernia, in the sac of which a Porocephalus was found. [Dr. Ellis erroneously ascribes the review in the *Bulletin*, above mentioned, to STANNUS both in the letterpress and in the reference.] *H. H. S.*

LEYVA (Jose F.) & GUTIERREZ (Eusebio). **Toxicological Studies of Nami, *Dioscorea hispida*, Dennst.**—*Jl. Philippine Islands Med. Assoc.* 1937. June. Vol. 17. No. 6. pp. 349–356. With 2 figs. [Summary appears also in *Bulletin of Hygiene.*]

Dioscorea hispida is a plant whose tuber is used for food in the Tagalog provinces and other parts of the Philippines under the name *nami*. It has frequently caused accidental food poisoning and has been used with criminal intent (compare *Blighia sapida*, the Akee, in Jamaica). The poison ordinarily is removed, or removal is attempted,

Tubers of *Dioscorea hispida* Dennst., used as food in many parts of the Philippines.

[Reproduced from the *Journal of the Philippine Islands Medical Association.*]

" by a crude method." [The method is not mentioned in this article, but on the analogy of bitter cassava, *Manihot utilissima*, may be by repeated washing.]

For their experiments the authors used mature, full grown tubers, which have a hairy " back," and beneath this a yellow cortical layer and an inner yellow, fleshy, medullary part. Hydrocyanic acid or a cyanogenetic glucoside was looked for, but neither was found. By process for extraction of alkaloids, one of these was obtained and found to be soluble readily in water, alcohol, and chloroform, not soluble, or only sparingly, in ether. It gave reactions like those of dioscorine, described by GORTER and by SCHUTTE as extracted from a Java variety 40 years ago. The alkaloid was present, more or less uniformly distributed, in both cortical and medullary parts. Its toxicity was tested on mosquito fish, on mice and on a monkey, and by analogy the fatal dose for a man of 50 kgm. would be 2·5–3 gm. *H. H. S.*

WEDD (G. D.) **The Manchineel Tree.**—*Jl. Roy. Nav. Med. Serv.* 1937. July. Vol. 23. No. 3. pp. 250–254. With 2 figs.

The author gives a brief account of the irritant and vesicant properties of the juice of the Manchineel tree, *Hippomane mancinella*, which from cases coming under his own observation he thinks have been grossly exaggerated, an opinion supported by experiments in which local application of the juice was followed by erythema in an hour and small vesicles the following day, disappearing in three days. [The author states that he can find no reference to the subject in the current medical text-books. Presumably BYAM and ARCHIBALD's

Practice of Medicine in the Tropics is no longer regarded as a current text-book, for an account is given of the poisonous effects of the fruit when eaten and incidentally its use as an arrow poison is mentioned (Vol. 1, pp. 778–9 ; & p. 773), and the tree and fruit are illustrated ; reference to this *Bulletin* as recently as September 1936, Vol. 33, p. 723, would have provided further information.]

H. H. S.

WEISE (W.). Vergleichende Untersuchungen zur Methodik der Hämoglobinbestimmung im Blute. [**Comparative Investigations of Haemoglobin Estimation in Blood.**]—*Biochem. Ztschr.* 1937. Sept. 24. Vol. 293. No. 1–2. pp. 64–93. With 2 figs. [26 refs.]

By the use, in combination, of a colorimeter of the Dubosc type with a monochromator and a rotating sector for the adjustment of light intensity an apparatus was constructed, which gave very exact readings without a comparison solution. Spectrocolorimetric estimation of haemoglobin as reduced haemoglobin is also a reliable process, which shows good agreement with the results of gas analysis. For control of the spectrophotometric measurement of oxyhaemoglobin it is preferable to employ Hüfner's quotient. These quotients varied with one exception within the narrow limits of 1·64 and 1·67. The average of all the observations was 1·649. The details of these methods and of the working of the instrument used must be consulted in the original. Of more interest to the clinician are the comparisons made of physicochemical laboratory methods with those which are used in medical practice. The first of these relates to the measurements of haemoglobin content after transformation into haematin. Here a warning is given of the error which may appear in estimations due to the presence in the blood under modern conditions of civilization of such derivatives of haemoglobin as carboxyhaemoglobin, methaemoglobin and sulphaemoglobin. In the process of transformation of blood pigment into haematin all those derivatives of haemoglobin, which might exercise an effect on the result, furnish exactly the same product. It was desirable, therefore, to determine exactly what result the " total haemoglobin " gave by its transformation. The ordinary clinical hydrochloric haematin method could not be used for this purpose because here the haematin is present in very labile colloid form. The method which proved especially useful was the estimation of haematin in alkaline solution. The haemoglobin (0·2 cc. blood) was first transformed into acid haematin with hydrochloric acid acting for 10 minutes at 40°C., or 40 minutes at room temperature. To this was added 2·5 cc. N/10 sod. hydroxide and, after cooling, 20 cc. water. The haematin determination was made in the spectrocolorimeter. It was found that by this method exact estimations of total haemoglobin could be obtained, but that, even in an alkaline solution, allowance has to be made for the effect on colorimetric determinations of the colloids (serum) present. Another method considered is that of the iron content of the blood. General unanimity exists on the subject of the iron content of serum or plasma. It stands normally at 0·1 mgm. per cent. This is equivalent, for whole blood, to 0·05 mgm. per cent. a value which is practically negligible

by comparison with the 40 to 60 per cent. of haemoglobin iron. Thus the iron content of haemoglobin in normal blood may be exactly computed. The author has worked out a satisfactory iodometric method applicable to small quantities of blood :—

(1) Mix together 1 cc. 20 per cent. sulphuric acid (about 5N) and 2 cc. whole blood, rendered incoagulable with oxalate or heparin. (2) Place at 115°C. to desiccate for 3 hours. (3) Convert to ash in an electric furnace. (4) Convert the oxide of iron of the ash to sulphate, by addition of 5cc. 20 per cent. sulphuric acid and wash over into a flask. (5) Evaporate off the water, but not too completely lest the ferric sulphate be rendered anhydrous and difficult of solution. (6) Dilute the sulphate solution with water, completing the volume to 50 cc. and add 1 cc. 1 per cent. starch solution. (7) Pass carbon dioxide through the solution for 10 minutes. (8) Add 2 gm. pure pot. iodide and leave 20 minutes. (9) Titrate with N/100 thiosulphate (1 cc. N/100 thiosulphate = 0·5584 mgm. iron) and N/100 pot. iodide. (10) Control the reliability of the method by analysis of a standard ferric sulphate solution of 1 mgm. iron per cc.

As this method required a minimum of 2 cc. blood, test was made of Wong's colorimetric process for smaller quantities. This proved satisfactory and is recommended for the standardization of clinical haemoglobinometers. Very concordant results for blood iron were obtained with these two methods :—57·5 mgm. per cent. iodometric and 57·6 mgm. per cent. colorimetric.

Finally, comparative determinations were made on whole blood, with 25 normal samples, of the methods :—Oxygen absorption, iron, reduced haemoglobin, spectrophotometric (Hüfner's quotient and Hb), haematin. All the five methods could not be carried out in every case with the blood available. They all gave good agreement.

W. F. Harvey.

CORDERO (Narciso). **Present Status of Hemoglobin Estimations.**—*Jl. Philippine Islands Med. Assoc.* 1937. May. Vol. 17. No. 5. pp. 263–269. [15 refs.]

In this valuable paper the author critically reviews the limitations and shortcomings of the different methods of estimating haemoglobin.

Three fundamental determinations have formed the basis of most clinical haematological methods employed in estimating haemoglobin in blood. The first is Hüfner's value of the oxygen combining capacity of purified haemoglobin, 1 gramme being estimated to combine with 1·34 cc. of oxygen at 0°C., and 760 mm. Hg. The second is Haldane's figures for the oxygen combining capacity of whole blood, 100 cc. of which were estimated to combine with 18·5 cc. of oxygen under standard conditions. The third consists of determinations of the oxygen binding power of whole blood with the van Slyke blood gas apparatus. For normal Americans the average figure was 20·9 volumes per cent.

In certain clinical methods such as that of Talquist and Dare, unchanged blood is used, while in others such as Sahli's and Newcomer's, the blood is changed into acid hematin before comparison with the standard. Though, in recording results, it is still common to use the percentage method, there is a tendency to express haemoglobin values in grammes of haemoglobin per 100 cc. of blood, and for this

purpose Hüfner's figure for the oxygen binding capacity of 1 gramme of haemoglobin is universally used. Haemoglobinometers are numerous and have different standards as follows :—

Sahli	17·3 gm. per 100 cc. blood.
Dare	16·9 ,, ,, ,, ,,
Newcomer	16·9 ,, ,, ,, ,,
Fleischl Miescher	15·8 ,, ,, ,, ,,
Oliver	15·0 ,, ,, ,, ,,
Haldane	13·8 ,, ,, ,, ,,
Talquist	13·8 ,, ,, ,, ,,

The advantage of expressing results in grams is that, regardless of what is normal, the value represents a definite quantity which will be the same whatever apparatus is used. The actual determination of the normal has to be established for each locality or group of people.

The blood of a normal Englishman should not be radically different from that of an American unless it be due to differences in the methods employed, and under these circumstances it is not surprising to find that the Haldane blood gas apparatus gives lower results than the van Slyke with the same samples of blood or haemoglobin solution. Furthermore, Hüfner's figure, that 1 gm. of haemoglobin combines with 1·34 cc. of O_2 assumes that the haemoglobin is 100 per cent. pure, but actually this cannot be the case since during its preparation a small amount of inert methaemoglobin must be formed. The purest preparations of recrystallized haemoglobin are now estimated to contain 5 to 10 per cent. of methaemoglobin. Van Slyke estimates on theoretic grounds that 1 gm. of haemoglobin should combine with 1·36 cc. of O_2.

Wong and others have recently estimated haemoglobin by determining its iron content after desiccation. All organic matter in haemoglobin or blood is first destroyed by strong acids and the Fe subsequently determined by the thiocyanate or another method. The number of mgm. of Fe divided by 3·35 gives the mgm. of HbO_2 in 100 cc. of blood. Just how this method checks up with the O_2 capacity method has not yet been determined.

The average haemoglobin in Filipinos' blood is estimated as from 12·4–14 gm. per 100 cc. of blood. Finally, the author enjoins clinicians to express haemoglobin values in grammes per 100 cc. of blood, and stresses the necessity for checking standards from time to time by the O_2 binding capacity method or the iron method.

N. Hamilton Fairley.

Harvey (W. F.). **Studies in Method and Standardisation of Blood Examination. V. The Blood Platelet Count.**—*Edinburgh Med. Jl.* 1937. Apr. Vol. 44. No. 4. pp. 231–234.

The author described a method for estimating the number of blood platelets which involves their direct count in a red cell haemocytometer chamber. Finger blood is diluted 1–100 in a red cell pipette with an 0·35 per cent. salt solution which haemolyses most red cells but apparently does not destroy the platelet elements. The pipette is left for one hour at room temperature and four mixings are made during

this interval. As the blood platelets do not sink as readily as erythrocytes, it is necessary to focus up and down over each unit square in order to ensure that all are counted. Figures obtained from daily counts of the blood platelets on a single individual were analysed and ranged from 150,000 to 210,000 per cmm. These values, as the author suggests, are definitely lower than those obtained by other observers and may be due to some having been lost by adhesion to the diluting pipette. The blood platelet count is given in the shape of a frequency distribution, as a reasonable normal for this particular method of estimation, with range, mean, and standard deviation. No claim is made that this represents absolute figures, but the author suggests that subnormal, normal and supernormal conditions of the thrombocytes can be estimated by comparison with this standard.

N. Hamilton Fairley.

DHAR (Jyoti). **Normal Hematological Standards in Indian Women.**—*Folia Haematologica.* 1937. Vol. 57. No. 1. pp. 78–86. [16 refs.]

A most useful study, the results being based on investigations of the blood of 86 women apparently in normal good health ; 77 were healthy college students, 5 probationer nurses and 4 others, relatives of patients in hospital. All were born of Bengali parents and were brought up in Bengal ; 34 were between 16 and 18 years of age, 29 between 18 and 21, 14 between 21 and 25, and 9 over this age. The author himself made all the investigations thus reducing, at least unifying, any personal error. He studied the red and white cell totals, haemoglobin value, mean corpuscular haemoglobin, diameters of red cells, differential leucocyte count and reticulocytes ; in fact, the only point of importance omitted was the Arneth count.

The figures are worth placing on record and the author's table is therefore reproduced :—

Normal Hematological Standards in Indian Women.

	Average Values
Red cells (millions per c.mm.)	3·73
Hemoglobin (grams per 100 cc.)	11·47
Hemoglobin (Sahli value)	66·68
Pigment-cell ratio (milligrams per 100 millions of red cells)	3·07
Mean corpuscular hemoglobin (micro-micrograms)	30·75
Hemoglobin coefficient	15·60
Color Index	0·99
Mean diameter of red cells (microns)	7·00
Reticulocytes (percentage)	0·94
Leucocytes (thousands per c.mm.)	5·61
Basophils (percentage)	0·13
Eosinophils (percentage)	3·24
Neutrophils (percentage)	64·84
Myelocytes (percentage)	0·01
Juveniles (percentage)	1·38
Stab forms (percentage)	9·83
Segment-nuclears (percentage)	53·53
Lymphocytes (percentage)	30·29
Monocytes (percentage)	1·50

H. H. S.

NAPIER (L. Everard) & DAS GUPTA (C. R.). **Haematological Studies in Indians. Part VII. The Incidence and Degree of Anaemia amongst Pregnant Females of the Coolie Population.**—*Indian Jl. Med. Res.* 1937. Apr. Vol. 24. No. 4. pp. 1159–1163. With 1 chart.

In this paper the authors report on the haemoglobin values observed in 228 pregnant women in 19 different tea gardens in Assam. Estimations were made with the Hellige apparatus. The mean haemoglobin of the whole series was 9·22 grammes, which was distinctly lower than the figure of 10·03 grammes calculated as the normal for coolie women. The low figure of 6·875 grammes (50 per cent. haemoglobin) was arbitrarily taken as the lowest level for normality. On this basis 192 were regarded as falling within normal limits and 36 as definitely anaemic. The mean and standard deviation of this so-called "normal" group was 9·99 $\pm$ 1·72 grammes which closely approximated to the figures obtained for non-pregnant coolie women, *i.e.*, 10·03 $\pm$ 1·70. From the evidence available they conclude that whilst pregnancy tends to increase very slightly the incidence of anaemia, it does not lower the haemoglobin level of the female population to any appreciable extent.

There was no correlation between the incidence of anaemia and the duration of pregnancy, but definite anaemia was most common in the youngest age groups. Statistically the percentage incidence of anaemia was "significantly" greater in the first pregnancy than in pregnancies subsequent to the fourth, but the difference between the first pregnancy and the second, third or fourth respectively, although considerable, was not significant.

In summarizing the authors record their opinion that though the haemoglobin state of the general female population was far below that of other female populations, there was little evidence of any general physiological lowering of the haemoglobin level in pregnancy such as has been observed in other countries. The incidence of definite anaemia during pregnancy was slightly higher than in the general female coolie population, especially amongst the younger women and during the first pregnancy. *N. Hamilton Fairley.*

NAVARRO (Regino J.). **Hematology in Filipinos : I. Normal Blood Iron Content : Hemoglobin Determination through Iron.**—*Jl. Philippine Islands Med. Assoc.* 1937. June. Vol. 17. No. 6. pp. 331–338. [13 refs.]

The author in this investigation had three ends in view : (1) Determination of the normal Fe content of the blood in Filipinos ; (2) Obtaining an accurate and practical method of estimating the haemoglobin : (3) Replacement by a simpler method than van Slyke's of a means of standardizing clinical haemoglobinometers. His subjects included students, nurses, hospital attendants, considered to be in good health,—101 males and 34 females. Ten cc. of blood were taken into a test-tube containing two drops of 30 per cent. potassium oxalate and one cc. was used for the test. The Fe was determined at first by Dupray's modification of the Wong method, later by Wong's later modification.

The haemoglobin content was calculated by dividing the Fe content by 3·35. The Hb. content was found to be 14·1 gm. per 100 cc. in

males, 12·6 gm. in females, that is less than American normal standards, but higher than previous Filipino records. The author suggests that to maintain accurate clinical records the haemoglobinometers in use should be checked at frequent intervals with iron values. Individual detailed findings are presented in tables. *H. H. S.*

SUZUKI (Tamotsu). **How to judge Blood Picture. Part I. A Study on the Relation between Prognosis and Neutrophile Blood Picture (in Cases of the Infantile Diarrhoea). 7th Hematological Paper. Part 2. A New Standard Table of Normal Blood Picture for Every Age and a New Resistance Triangle of Leucocytes. 8th Hematological Paper.**—*Tohoku Jl. Experim. Med.* 1937. Mar. 15. Vol. 30. No. 5. pp. 368–377. With 1 coloured fig. [13 refs.]; pp. 378–388. With 4 figs. [49 refs.]

The authors in this paper have studied the relationship between the prognosis in cases of infantile diarrhoea and the neutrophile blood picture, with special reference to the nuclear shift, and whether it is regenerative or degenerative in character. Blood examinations were made on admission and 38 patients were investigated from this viewpoint. The blood of seven out of nine patients who recovered showed a left shift of a regenerative nature, while in sixteen out of eighteen fatal cases the nuclear shift to the left was degenerative in type. A close relationship existed between acidosis and nuclear shift. Thus, all the twenty patients who presented marked acidotic features also showed a marked left shift of the neutrophiles. Excessively abnormal responses, whether of the nature of a very high neutrophilia or as marked neutropenia, indicated a bad prognosis. Similarly, a disturbance of parallelism between the nuclear shift and the neutrophil count was ominous.

A severe shift did not necessarily imply a graver prognosis than a slight shift. Qualitative as well as quantitative observations have to be made and it is essential to differentiate whether the cells are of regenerative or degenerative type. Where the degree of left shift is high, a shift of a regenerative nature will generally carry with it a rather better prognosis.

It is pointed out that in the domain of pediatrics the interpretation of the blood picture is complicated by the considerable amount of physiological variation which occurs at different ages. With the object of getting over this difficulty the author has published a new standard table of normal blood pictures for every age and a new resistance triangle of leucocytes. The latter supplies information for judging prognosis in any given case.

Those interested are advised to consult the original paper.

N. Hamilton Fairley.

REVIEWS AND NOTICES.

ROCKEFELLER FOUNDATION. INTERNATIONAL HEALTH DIVISION. **Annual Report 1936.**—278 pp. With 23 figs. (1 map) on 11 plates. New York: 49 West 49th Street.

The appearance of the Annual Report of the International Health Division of the Rockefeller Foundation has come to be regarded as an event of international importance and as showing what can still be accomplished by true co-operation in the realms of hygiene, sanitation and medical science in this nationally-minded and politically-troubled world.

This record for 1936 is one of steady progress in almost every sphere and there appears to be no slacking-off of the beneficent activities of this great Institution, the death of whose founder has so recently occurred—one who had lived to his full span and had been able to see the outcome of his life's work accomplished. It is otherwise in the sad note at the commencement of the report in the tragic demise, the result of an accident, of Dr. Wray Lloyd, whose name will ever stand high amongst the heroes of yellow fever research in Brazil and West Africa.

The report includes brief accounts of the articles published by the staff members in 1936 and the early part of 1937 and represents the results of field and laboratory studies in yellow fever, malaria, influenza, scarlet fever, tuberculosis, hookworm disease, bilharziasis, yaws, rabies and other diseases and also includes a review of 86 articles which have appeared since the publication of the 1935 Report.

In the control of specific disease yellow fever ranks first. As is well known, as the result of an agreement between the British Colonial Office and the International Health Division, wide surveys undertaken in Africa and South America have produced evidence that the disease is spread much wider than had been suspected. It is probably true that as virucidal substances are present in the sera of some humans who have not been exposed to the yellow fever virus, it would probably be possible to demonstrate the presence of such virucidal substances in normal human serum in varying degrees of concentration. Jungle yellow fever is to be regarded possibly as the natural or original form. The yellow fever virus is a highly complex body and its two main affinities—neurotropism and viscerotropism—have been modified by appropriate procedures, and fortunately, as far as can be determined, extreme modifications do not lead to any antigenic changes, so that an animal immunized against the most avirulent is immune to the most virulent strain. Yellow fever virus has been successfully cultured in the developing chick embryo so that it has been shown that prolonged cultivation of the virus *in vitro* results in a change in its pathogenicity, especially as regards its viscerotropic affinities, but the neurotropic virulence remains unaltered. A new technique by which it is possible to concentrate and isolate the particles of yellow fever virus has been rendered possible by the invention of a new centrifuge which operates in a very high vacuum. This is known as the ultracentrifuge with an air-turbine drive. An oval rotor with a transparent quartz cell placed at a distance of 65 millimetres from the axis of rotation can be run regularly at a speed of 60,000 revolutions per minute which represents a centrifugal force of about 260,000 times gravity in the cell. Suspensions of the virus are made in normal monkey serum, or in ascitic

fluid, as the virus becomes inactivated when suspended in distilled water or in physiological saline. Celluloid tubes are employed.

Working much on these lines studies on the influenza virus have been pushed forward by Dr. Thomas FRANCIS, Jr., and Dr. T. P. MAGILL, who were appointed to the staff of the International Health Division for this purpose. Light has been shed upon a number of fundamental features of one variety of influenza, such as the characteristics of the virus, its antigenic properties, its pathogenicity and its behaviour in tissue culture. At first the ferret was found to be susceptible to human influenza virus, but it is by no means satisfactory as a laboratory animal. Later it was found possible to infect the mouse *after passage* through the ferret. Other animals have played an important part, notably the pig, whose own strain of influenza presents many similarities to that of man, but the virus of which appears to be serologically distinct.

The immunological identity of two American with one English strain has now been definitely established. It has been possible to demonstrate a state of immunity to influenza subsequent to inoculation with the human influenza virus. As there are objections to the use of epidemic influenza virus derived from ferrets and mice for human inoculation, it is now possible to utilize tissue culture in which mixed embryonic chick or chorio-allantoic membrane are employed.

Much progress has been made in the United States in a study to arrive at better and safer anthelmintics for hookworm disease. As a result of the studies of Dr. P. V. LAMSON, there is now available a safe and effective drug in Tetrachlorethylene, and a safe and effective ascaricide in Hexylresorcinol, which can be used for mixed infections of ascaris and hookworm as it kills the parasites and causes no migration.

Some idea of the widespread and munificent activities of the International Health Division can be gleaned from the revelations of its budget. In 1936 a sum of $684,457 was allotted to seven public health administration projects in the United States and to two in Mexico. A grant of $2,200 was allocated for a detailed survey of the public health administration of Hungary, with the result that there are now there 214 full time Health Officers—all Graduates of the School for Public Health in the State Hygienic Institute.

Examples of assistance to State activities are almost too numerous to mention, but a few may be cited. In Greece aid was given to a study of water supply and excreta disposal ; a member of the Staff conducted a course in Sanitary Engineering in the Turkish School of Hygiene at Ankara. As an object for demonstration a nearby village was chosen which up to that time had been receiving a meagre and contaminated water supply through a clay pipeline.

In India, in the United Provinces, co-operative sanitary work was carried out, including the improvement of wells, installation of latrines, bathing platforms and manure pits. In Cyprus two experimental engineering schemes for the control of *Anopheles superpictus* were devised ; in Egypt, co-operation with the Royal Society of Agriculture resulted in the installation of a subsoil irrigation project having an important bearing upon the control of bilharziasis.

In extending aid to education for public health nurses, the International Health Division has been guided by certain general objectives, which include financial divorcement of nursing education from the Hospital Nursing Service, as well as the incorporation of the public

health idea into the general nursing course. On this basis the School of Nursing in the University of Toronto was opened in July 1933. Towards the financing of this new type of nursing education a grant of $87,500 was made for a five-year period from 1932 onwards.

The Vanderbilt University School of Nursing received a grant of $12,000 to provide the salary of an Associate Director of Public Health Nursing during the period July 1936 to June 30th, 1940. This University has now received foundation funds for the development of nursing since 1924 totalling nearly a million dollars, which has been used mainly for endowment.

In 1936, $215,000 were made available for allocation of Fellowships in Public Health, the travel of Government health officials, teachers of public health and training of health workers, whilst no less than 182 Fellowships in various fields of public health were supported from these funds. To gain some idea of the immensity of scope and range of these beneficent activities, it is stated that from the beginning of the Fellowship programme in 1917 to December 31st, 1936, no less than 1,268 persons have held Fellowships in Public Health, and they hailed from almost every country on earth so that even such remote spots as the Solomon and Virgin Islands are included.

It will be readily understood that in this brief survey of such a great undertaking which has laid the whole of medical science under such a debt only a few of the more important aspects of this Report can be touched upon. *P. H. Manson-Bahr.*

EAST AFRICA. **Higher Education in East Africa. Report of the Commission appointed by the Secretary of State for the Colonies** [DE LA WARR, Chairman]. September, 1937. Colonial No. 142. 136 pp. With 1 diagram & 1 folding map. 1937. London: H.M.S.O. [2*s.* 6*d.*]

It may be assumed that readers of this *Bulletin* will be chiefly interested in the parts of the Report which bear on the improvement of health in the natives of East Africa. It has long been evident that healthy living and reduction of preventible disease on the large scale in Tropical Africa will not come about till there is sufficient leaven of instructed natives. Education is all-important in this regard and it is more than a coincidence that the beginning of the striking fall in infant mortality in England corresponded in time with the marriage of the children of 1871, the year in which elementary education became compulsory.

The Commission take as axiomatic the propositions that the primary need of East Africa is the improvement of health and agriculture, that is, the better use of the soil, and that such improvement can best be achieved (*a*) through the general training of Africans, (*b*) by training in sufficient numbers qualified African experts. They invited the departments to state how many trained Africans they expected to require in the near future and sum up the "needs" in a table. To take two examples, it appears that the medical departments of Uganda and Kenya in the next ten years can use respectively 130 and 157 African medical assistants; these are minimum requirements. Discussing stability of character of educated Africans, they point to the low pay often offered and recommend the formulation of a salary scale providing an adequate living wage at the bottom and a complete

ladder to the grade at present staffed by European university graduates; the salaries should enable the recipients to marry.

Under the heading, Primary Education, they praise the Native Administration Schools in Tanganyika, which are coming to fill a vital place in the life of the people. These schools are closely associated with health and maternity work and centres, afforestation and anti-erosion measures, agricultural demonstration and training centres, animal husbandry and veterinary work. They are inexpensive vernacular schools under African teachers and boys and girls trained in them readily find a place in the village from which they come. The Report advises that similar schools should be started in Uganda. They point to the backwardness in East Africa of women's education and quote the adage "If you educate a man you educate an individual, but educate a woman and you educate a family." Only ten per cent. of the girls of school age attend any type of school and no European women are employed by Government to train African girls. This must be promptly remedied and they suggest that women appointed as teachers should be required before going overseas to attend a special course in Great Britain on tropical hygiene and diseases, dietary, child welfare, etc. The training of native women teachers should be expanded in both quantity and quality and the training of women for employment should be centred upon: (1) teaching, (2) nursing, (3) maternity work, (4) school matrons, (5) children's nurses. The Church Missionary Society's Training Centre at Buloba is commended.

In Part 3, Advanced Education, readers will turn to the chapter headed Medicine. The school for the advanced training of Africans in medicine and surgery has been described in this *Bulletin* [1933, Vol. 30, p. 659]. It was opened at Mengo by the Church Missionary Society in 1913, but was closed after the War and in 1923 Dr. H. B. Owen, of the Government Service, took charge. The school now contains 30 students and it is expected in ten years' time to produce 30 qualified African Medical Assistants annually. The school is here described with the comment "We cannot speak too highly of the magnificent work of the founder of the school, Dr. H. B. Owen and of his successor, Dr. Mitchell."

A. G. Bagshawe.

Schoute (D.). **Occidental Therapeutics in the Netherlands East Indies during Three Centuries of Netherlands Settlement (1600–1900).**—pp. iv + 214. With 4 figs. [Refs. in footnotes.] 1937. Batavia: Netherlands Indian Public Health Service.

This is an abbreviated edition in English of two books published by the author in 1929 and in 1935 in Amsterdam and in Batavia. The present publication has been printed under the auspices of the Public Health Service of the Dutch East Indies on the occasion of the Conference of Far-Eastern Countries on Rural Hygiene held in Bandoeng in Java during August 1937.

The book reveals one of the most fascinating chapters in the history of medicine: the progress made in medical work in the Dutch East Indies during the three centuries from 1600 till 1900. From the primitive beginnings when the care of early colonizers and of sailors on perilous voyages was placed by the East India Company in the hands of surgeon-barbers, we watch the great progress made towards the establishment of a medical service with its modern hospital system which has made Java and most of the Islands in the Malay Archipelago

safe for both Europeans and Natives. Intended originally in the days of the East India Company to protect European settlers against ravages of deadly epidemics and based purely on commercial principles, it developed gradually into a highly organized public health service with a high standard of social morale which has brought great blessings to the masses of the native population.

It is interesting to note that the author ascribes the change from the commercial mentality of the East India Company to the ideological social work which inspires the present-day medical service of the Dutch East Indies to the influence of Thomas Stamford Raffles, who was Lieutenant-Governor of Java from 1811 till 1816.

This book is certainly worth reading and it should be of particular interest to students of history of medicine, as it gives a most vivid and well documented picture of the struggle against disease in the Dutch East Indies during the last three centuries. *H. Lomas.*

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